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Hunterian Lecture

ON

THE DEVELOPMENT OF THE STRUCTURES ASSOCIATED WITH THE ROOF OF THE PRIMITIVE MOUTH.

Delivered before the Royal College of Surgeons of England

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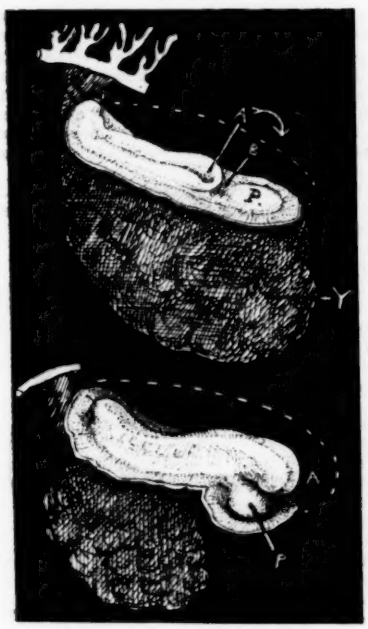
MR. PRESIDENT, LADIES, AND GENTLEMEN,—The lecture which I have the honour of delivering before you deals with a subject about parts of which a good deal has been written from time to time, for there is an evident pathological importance in the developmental questions concerned, in addition to the purely anatomical interest that centres in their elucidation. The description that I propose to give is based largely on my own observations, and it will, I hope, enable you to take into account one or two new points of view in your conception of the roof of the early mouth and its derivatives. I am dealing only with the roof of the common cavity; the cavity is derived from the oral sinus, and this in its turn is a modification of the stomodæum, which will thus provide a convenient starting-point for the description.

FIG. 1.



Diagrams of embryonic plates with the amnion cut away round them, its extent being indicated by the interrupted line. The plate lies on top of the yolk-sac, Y. To show how the forebrain, A, growing forward in the direction of the arrow, not only projects over B, the bucco-pharyngeal area, but reverses this and the pericardium, P, below it. Thus the anterior end of the embryo comes into existence as a projection in front of the yolk-sac, drawing forward in its interior a prolongation from this, the foregut. In the second figure the stomodæum is seen as a cleft between A and P, and the bucco-pharyngeal area must form its base and separate it from the foregut.

THE STOMODÆUM AND ORAL SINUS.

The stomodæum is simply the recess or cleft between the overhanging prominence of the forebrain and the pericardium. When the walls of the neural groove begin their rapid growth they tend to bulge forward over their anterior limit, and also to carry this margin forward beyond the confines of the embryonic rim, reversing and folding under them the bucco-pharyngeal and pericardial areas of the embryonic plate. (Fig. 1.) The anterior end of the neural region thus projects beyond the level of the bucco-pharyngeal membrane, turning itself forwards and downwards round its continuity with the upper end of the membrane, and so coming to lie above the pericardium, both projecting beyond the level of the membrane. The stomodæum, therefore, can be considered to be in its essence a transversely disposed cleft or recess, open at each side, roofed by the neural projection or forebrain, floored by the prominence of the pericardium, and separated by the bucco-pharyngeal membrane at its base from the foregut or primitive pharynx, a diverticulum of the general archenteric cavity that is included in the interior of the front part of the embryo which projects beyond the embryonic rim.

It is evident that a recess of this nature cannot be looked on as representing an early stage of the mouth of any vertebrate animal possessing jaws, and the stomodæum is really only the place where the mouth will be built up—the frame, as it were, within which the true mouth structures are about to appear. These new structures are to be found at a very early stage; in fact, it is doubtful, I think, whether such a simple stomodæum as is shown in the diagram in Fig. 1 is ever really present in the human embryo. Such stages are only known to most of us by description and figures, for the specimens are few in number, and I am not one of the fortunate possessors of them. The earliest human embryo that I possess, after the stage of an embryonic plate, already shows a mandibular arch, although its forebrain is only just projecting over the bucco-pharyngeal area. On other grounds I consider this specimen abnormal, but examination of the records of other embryos tends to confirm me in my suspicions about the existence of a simple stomodæum, at any rate for more than a very brief time and with a very slight depth. The point need not detain us, and it will be quite sufficient for us to recognise that the mandibular and maxillary processes, those concerned with the formation of the true mouth, make their appearance on the scene at a very early stage in development.

FIG. 2.

Diagrammatic sketch of anterior end of embryo from the right, showing the pharyngeal arches. The mandibular arch is seen joining its fellow above the pericardium, and the maxillary process is growing forward from its upper part. The oral sinus lies between these visceral structures of the two sides.

The mandibular arch, formed in the wall of the primitive pharynx immediately behind the ventro-lateral attachment of the bucco-pharyngeal membrane, grows forward (Fig. 2) on the upper aspect of the pericardium and forms a new floor for the deeper part of the cleft. At the same time the maxillary process extends forward and below the forebrain on each side; it is derived from the upper part of the mandibular arch, and thus constitutes a sort of side wall to the deeper portion of the recess. In this way the *oral sinus* comes into existence, at present only in the deeper part of the cleft between forebrain and pericardium, but destined to enlarge rapidly as its boundaries grow. It is limited below by the mandible and on each side by the maxillary processes, and is separated at its base by the bucco-pharyngeal membrane from the cavity of the foregut; this membrane soon breaks down and disappears. Between the two maxillary processes, however, the central part of the stomodæal cleft still remains, with the posterior part of the forebrain forming its front and upper wall, and this can be taken as the earliest definite indication of Rathke's pouch.

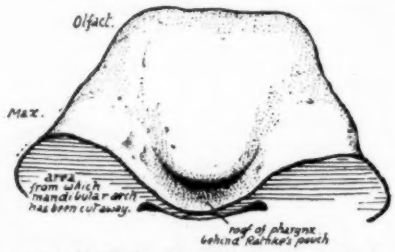
EARLY STAGE IN DEVELOPMENT OF ROOF OF MOUTH.

Fig. 3 shows the roof of the mouth in an embryo of about 4 mm. in which the mandibular arch has been cut away and the region viewed from below. The general surface, lined by ectoderm, covers the lower aspect of the forebrain, and on each side the two maxillary processes are to be seen as slight elevations of this surface, extending forward for a little distance from the upper ends of the cut stumps of the mandibular halves. At the anterior angles of the field the ectoderm is thickened; this earliest stage of the olfactory area is a convex one, looking forwards, outwards, and downwards. Rathke's pouch is a widely open and not very deep sulcus between the maxillary processes, with a strongly convex anterior wall made by the rounded hinder part of the projection of the forebrain.

The forebrain in its early stage (thalamencephalon) is a single short rounded vesicle, with two optic evaginations projecting from it a little in front of the position of its back wall. In the figure the back wall of the vesicle is turning

into the floor in the rounded prominence that limits Rathke's pouch in front. The optic evaginations are short and widely patent outgrowths from the brain which lie above the maxillary processes, these separating them from the roof as exposed in the figure. The ectoderm of the roof and that of the brain are in close contact in the front wall of Rathke's pouch and for some distance on the roof in front of this; but more in front and at the sides they are separated by thin mesoderm, while at the sides further back the maxillary growth is, of course, situated between their levels. A little consideration will make it clear that the rounded prominence in front of the pouch is made by that part of the forebrain which was originally the anterior end of the walls of the neural groove (see Fig. 1), and the pouch itself is at first merely the angle formed between the bucco-pharyngeal membrane and this part of the brain when it turns itself downwards and forwards round the upper end of the membrane; later, when the membrane disappears, the angle is a

FIG. 3.



Lower aspect of head of embryo of 4 mm., the mandibular arch being removed. From a model.

more obtuse one between the brain projection and the roof of the foregut. The pouch can, in fact, be considered as marking the level of the original depths of the stomodæum in its central part, and this appears to be a very fixed region. The notochord terminates in close relationship to it; it is said in some forms to be connected with the top of the buccopharnygeal membrane. Fixity is indicated by the revolution of the forebrain round the spot, by the close and smooth connexion between neural and surface ectoderm, and by the persistence of the relation with the notochord, and is no doubt increased or helped by the occurrence of the bracket-like maxillary growth on each side of its position, extending under the forebrain and holding it in its angled bend.

We obtain evidence of fixation, too, in later stages. The neural tube in its rapid growth is held in front at this point, and in pushing forward it bends up the relatively thin and loosely held mid-brain into the well-known flexure behind the point. On the other hand, the growth of cerebral structures in front of this point tends, as we shall see later, to rotate the forebrain up somewhat round an axis passing through this region. In the adult skull, moreover, in ways which we need not pause now to consider, there has come about a peripheral divergence of regions, such as the orbit and the tubo-tympanic complex, but centrally they are more fixed, and the pituitary fossa seems to lie practically at the centre from which they may be said to radiate. Shortly, I think it is justifiable to describe the region of Rathke's pouch as the most fixed spot in the developing head, a fact which will help us to appreciate the changes that go on around it, changes of position which may be said in a general way to become more marked according as they are distant from this spot.

MESODERM OF ROOF.

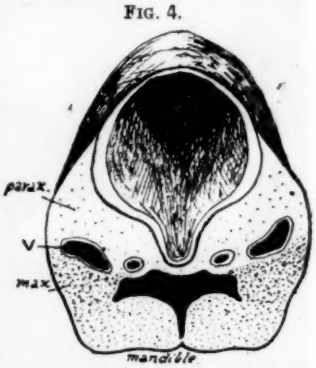
A forebrain turning over the fixed point (as in Fig. 1) to project forwards necessarily carries with it a mesodermal covering derived from, and continuous with, that in relation with the neural groove or tube of which it is an extension—that is, the forebrain has a covering of paraxial mesoderm belonging properly to it. In the roof of the mouth, as already pointed out, this covering is at first deficient centrally. Perhaps this is explicable on the view that the middle line here is a direct continuation of the mid-dorsal line of the tube, the line of closure and of neuropores, and the place where the tube is last covered by the middle layer. The bare area in the roof does not exist for long; the paraxial mesoderm extends into it from the sides, so that in a 5 mm. embryo it is already smaller, in one of 7 mm. it is not very much more than coextensive with the front wall of the pouch, and after this, as we shall see later, the cells invade this region from the sides, and ultimately effect the separation between the pouch and the brain.

When the maxillary process grows forward a new mesodermal stratum is added, derived from the lateral mesoderm, and this is applied to the superficial surface of the paraxial stratum. In its further extension it covers this surface, except in the pouch, and apparently the two mesodermal strata do not mix. Only these two strata are concerned in forming the tissues lying between the mouth and the brain, and certain definite structures are formed in each layer. I lay some stress on this double mesodermal origin, because it seems to me that many intricate questions—such as those concerning the comparative relationships between the parts of widely different skulls—might be brought much nearer solution if attention were paid to the nature of the layers in which the tissues are formed. By pushing the inquiry back into developmental stages, workers such as Parker and, to-day, Fawcett in this country, and Levi, Gaupp, and others elsewhere, have brought our information as to the comparative anatomy of the skull to a very high level. But the tendency has been to restrict these observations to the chondrocranium, whereas it seems to me that it might with advantage be extended back to the prechondral mesenchyme, and the results checked by the recognition of the strata and of the relations in the strata and between them; the chondrocranium is a structure already made, while the other line of research would throw the inquiry back into its making.

It was my original intention to deal in this lecture with some comparative work on these lines, following up certain observations I had made which seemed to be full of promise, but the circumstances of the present are in many ways unfavourable to such work, so I am constrained to confine myself to the human subject. The distinction between the two mesoderms is perhaps more marked in lower types than in the human embryo. Fig. 4 shows a section near the region of the pouch in a young mouse embryo; the distinction between the strata is as marked in the section as in the diagram. Perhaps if we could command the freshness of our human material as we can the other we would find the distinction as definite.

But there are other ways of fixing the levels of the strata. The large vein and the artery (Fig. 4) lie practically on the maxillary mesoderm, really embedded in the superficial layers of the paraxial stratum. This relation seems to be a constant one in mammals and birds—so far, at least, as I have had opportunities of investigating the matter. The artery is the internal carotid; it runs forward in this mesodermal relation from the region of the third visceral arch to the side of Rathke's pouch, where it sinks into the paraxial mesoderm to reach the brain. The vein is a large channel lying in contact with the inner aspect of the Gasserian ganglion (not shown in this section), and passing back between this and the seventh nerve to lie to the outer side of this last; it is the "vena capitis mesialis" of Salzer's description, more loosely referred to as the continuation of the vena capitis lateralis by some other writers. Perhaps it will avoid ambiguity if we term it, with Streeter, the "primary head vein." All the structures developed in this region from the paraxial mesoderm lie above these vessels, as also do the nerves going to the paraxial structures, while those formed in the maxillary stratum lie below them.

FIG. 4.



From a section through a model of the head of a young mouse embryo, showing the mesodermal layers.

A vascular plexus is carried forward from the vein on the crest of the advancing maxillary mesoderm and enables us to find the edge of the growth in the earlier stages without much trouble; these vessels are indicated in the models of

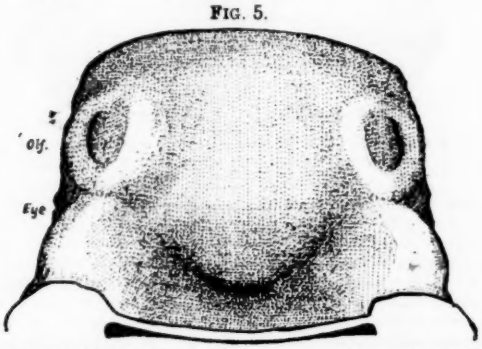
the early embryos. In later stages, however, and in some peripheral parts of the extending stratum, this method of finding and following its limits is not so valuable, but here other aids can be often pressed into service. Possibly, in the future, one may find more delicate differential staining to be of use in this respect.

GENERAL GROWTH OF ROOF AND NASAL CAVITIES.

The maxillary growth continues in a forward direction. Fig. 5 shows the roof in an embryo[1] of 7 mm., in which Rathke's pouch is still widely open but evidently deeper, and the maxillary processes are better developed and longer, coming very near to the olfactory areas. These areas are well marked on each side, showing slightly raised borders, and the field of observation has extended beyond them so that they no longer look forward but only outward and downward. The extension of the field is due to the growth of the telencephalon from the front of the thalamencephalon, and the model shows very clearly that this is a single forward growth, with only the very faintest lateral indications of secondary dilatations which will form the cerebral vesicles.

The eyes have been carried forward to some extent by the maxillary processes passing below them, so that they rest on the front parts of these processes and their stalks form an angle with each other widely open in front. The whole optic outgrowth is surrounded by paraxial mesoderm, and the ocular muscles are represented behind and internal to the optic cup as a condensation in the same stratum. I imagine that this condensation also includes a very early stage of the ala orbitalis in its inner part; the matter, however, is of subsidiary importance.

FIG. 5.



Lower aspect of model of head of 7 mm. human embryo. The maxillary processes are better marked, and between them the pouch of Rathke is being buried in the paraxial stratum. The olfactory areas are evident, surrounded by prominent lips. A new region in front of their level has been brought into being owing to the growth of the telencephalon.

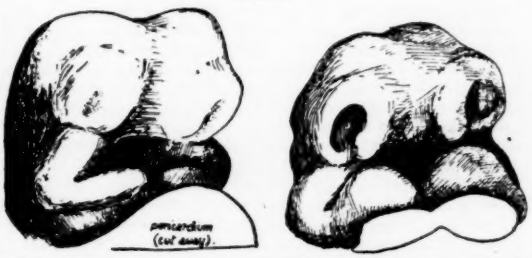
The maxillary process is about to come into relation with the hinder end of the olfactory area, and this is beginning to develop marginal lips, though it still retains the oval shape that characterised the earlier area, and its floor is still somewhat convex. The growth of these lips or nasal folds or processes goes on apace. They are thickenings of the paraxial stratum, and by rapid deepening on each side of the olfactory area they bury this between them, so that the original area on the surface of the roof is now sunk in an "olfactory pit" of which the side margins are the inner and outer nasal folds respectively. These folds can be seen forming in Fig. 6, gradually burying the olfactory surface; they are united in front and also, but to a very much less extensive degree, at their hinder ends. The posterior junction, though present, is even less well marked in the human embryo; it may be found in specimens of about 8 mm.

When the folds are formed, each outer one, though longer, appears shorter than the inner ones, owing to the slope on which they are built. The inner folds are connected by an intervening "infra-nasal area," where the paraxial growth has been rather less vigorous than in the folds themselves, and where there is consequently a depression on the surface. The two inner folds with the depressed region between them constitute the "fronto-nasal process"—a convenient term for use when referring to the whole central prominence separating the olfactory pits.

[1] I am indebted to Professor Peter Thompson for lending me the very excellent sectio s of this embryo, which he has described in "Studies in Anatomy," Univ. Birm., 1915.

The maxillary process comes up against the hinder end of the olfactory pit of its own side, its mesoderm being applied to the paraxial mesoderm of both inner and outer nasal folds, and to the low junction between them. The outer portion of the maxillary mass is evidently growing more rapidly than the rest, marking out a coarse margin to the roof and cavity, and constituting the most markedly prominent part of the whole process; the front part of this, at first applied more

FIG. 6.



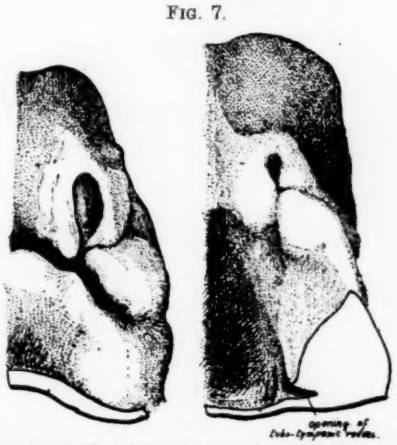
Heads of two mouse embryos, from models, seen from the front and rather from the right. To show the growth of the nasal folds. Observe that the maxillary process comes up against the back of the inner as well as the outer fold.

laterally to the outer nasal fold, then passes below it to meet the inner fold, which we have seen is at a lower level.

This development is shown in Fig. 7, taken from embryos of 10 and 12 mm. The hinder, outer, and lower aspects of the outer nasal fold in its posterior part are thus covered in by maxillary growth, and the corresponding part of the opening of the pit is closed by the extension across it of the maxillary process to reach the inner nasal fold, thus forming the "primitive palate" of Dursy. But about the same time, sometimes before and sometimes after the growth of the maxillary process across the pit, the lips of the two folds themselves meet and fuse, as is visible in both specimens in Fig. 7.

We see then that the so-called "primitive palate" is formed mainly by extension of maxillary mesoderm between the outer and inner nasal folds, but it also includes, above this, a separate meeting of paraxial mesoderm in these folds

FIG. 7.



Successive stages in the relations between the nasal folds and maxillary process as seen in embryos of 10 mm. and 12 mm.: in the model from which the last is drawn the mandible has been cut away, so that the roof of the mouth cavity is exposed. Observe that the two nasal folds come together in their hinder parts, and the maxillary process extends across below this fused area to meet and join with the inner and more prominent nasal fold. This extension is from the outer portion of the process, the inner part being but slightly prominent in the roof of the mouth, reaching the inner nasal fold from behind.

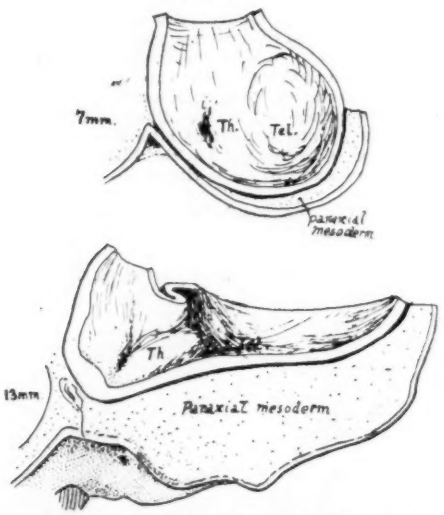
themselves. At the hinder end of the olfactory pit maxillary mesoderm in relation with the outer fold is continuous with that associated (Fig. 7) with the inner fold. This latter part of the maxillary extension is not thick like the other, but is at first a thin layer converging with its fellow towards the fronto-nasal process, where they meet and are laid over the hinder aspect of this process. Thus, when the maxillary primitive palate is formed it really meets maxillary tissue on

the inner fold and not the paraxial basis of that fold. The fusion of the epithelial covering of these two then forms an epithelial septum between them; in subsequent growth this epithelial lamina is widened out and thinned, forming the "bucco-nasal membrane," and this membrane then separates the olfactory cavity from that of the mouth behind the primitive palate.

We can now examine the growth of the maxillary process in its various parts. In its first stage it grows forward deep to the lining of the mouth, in contact with the paraxial mesoderm and without any trace of an epithelial layer between them. In its relation with the outer nasal fold, however, it first applies its epithelial surface to a like surface of the fold, so that an epithelial lamina separates them at first; this is present in the 12 mm. specimen (Fig. 7), but it is soon broken through by the extending mesoderm and disappears, save in part of its deeper structure, where it seems to persist and form the rudiment of the lacrymal duct. Also an epithelial lamina necessarily exists at first between the primitive palate and the fronto-nasal process, but this is quickly destroyed as the maxillary mesoderm advances on the surface of this process; but here again one part remains as the bucco-nasal membrane, showing plainly that no mesoderm extends across at this spot.

If we now compare this margin to the mouth which is being mapped out, we find that it corresponds in a sense with that shown in the 4 mm. specimen (Fig. 2), for the hinder and inner part of the olfactory region is in the field,

FIG. 8.



Longitudinal sections through the heads of embryos of 7 mm. and 13 mm. to show the great growth of the paraxial mesoderm, particularly in association with the nasal region. The growth has caused depression of the general level of the whole roof, especially in front, and has led to the pituitary being deeply placed with a long stalk. Notice also how it has affected the brain. *Th.*, in front of the optic opening, is in the thalamencephalon, while *Tel.* is in the telencephalon. The back part of the thalamencephalon is fixed in the pituitary region, but the front part and the floor of the telencephalon are lifted up by the paraxial growth.

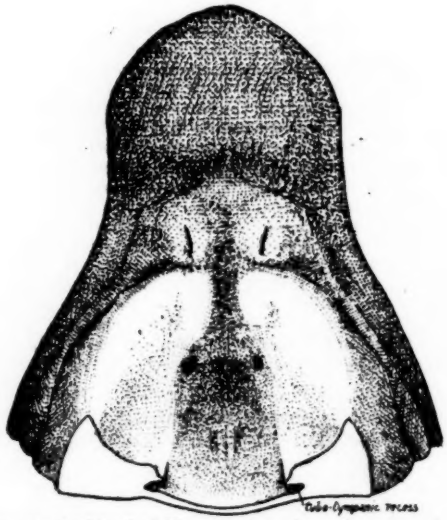
maxillary prominences mark its lateral boundaries, and the opening of Rathke's pouch, now reduced to a small passage, is seen behind, centrally placed between the bases of the maxillary processes.

But we have a new level for the roof. The great paraxial growth in the nasal region has depressed the front part and made the roof concave antero-posteriorly, and the great maxillary growth at the sides has had the same effect in a coronal plane. The least departure from the old level is in the centre behind, and even here the growth of paraxial mesoderm has brought the roof down, and the extent of displacement can be judged perhaps best by looking at the new level on sagittal section, comparing it with the position of the floor of the forebrain (Fig. 8), which might be taken to represent the old level. Comparison of the angle between this and the pharynx suggests that the paraxial growth in front has not only depressed this part of the roof of the mouth, but has also decidedly raised the front part of the forebrain.

FURTHER MAXILLARY AND NASAL GROWTH.

The roof in an embryo of 13-14 mm. is shown in Fig. 9. The various processes and folds in the fronto-nasal region are now definitely locked together by extension of the maxillary mesoderm and destruction of any intervening epithelial septa. The bucco-nasal membrane has gone, not as the result of mesodermal growth, but probably as a consequence of some of the processes of preparation, only some fragments of it remaining. It may persist to a much

FIG. 9.

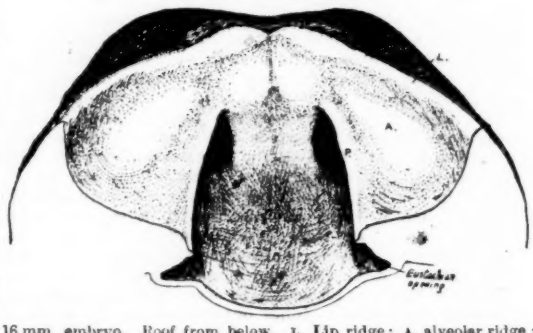


Inferior aspect of head of 13 mm. embryo, lower jaw removed. The impression of the short paired post-sphenoid bars is quite apparent in the roof. The pituitary opening is between them.

later stage, thinned out and stretched. Bryce figures it in an embryo of 16 mm., and I have seen its remains in one considerably older than this, but it appears to be very vulnerable as soon as the nasal cavities begin to grow, and does not as a rule survive for long. When it breaks down the resulting opening is known as the "primitive posterior naris," and this can be considered to exist *in posse* if not *in esse* from the time the membrane comes into being. Such a posterior nasal opening is very small at first, as is seen in the figure, and is situated far forward, immediately behind and above the primitive palate.

The lateral portions of the maxillary process are slightly more differentiated than in the 12 mm. specimen, but if we

FIG. 10.

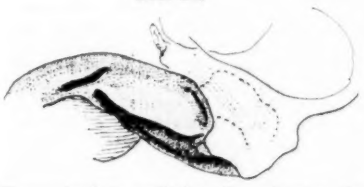


16 mm. embryo. Roof from below. L, Lip ridge; A, alveolar ridge; P, palate fold. The evident increase in width of the area is related to the growth of the brain above it. The increase takes place chiefly in the main maxillary mass and, behind this, in the mandibulo-maxillary region, and continues for some time. It is responsible to a large extent for the apparent change in position and outlook of the eyes from a lateral to a more anterior aspect.

look at the older stage of 16 mm. (Fig. 10) it is evident that three distinct regions are indicated here, parts that will ultimately develop into the palatine, alveolar, and labial ridges. These are all definite prominences of the maxillary region and are not brought into evidence as the result of

epithelial ingrowths. We see the same parts, better developed and more pronounced, in the 22 mm. (Fig. 11) and 28 mm. (Fig. 12) specimens. The lip ridge is the most external and dependent, reaching a large size quickly, though it is at first incomplete centrally. The alveolar ridge reaches the fronto-nasal process behind the labial fold and extends on to it in the same way, by mesodermal invasion, but its progress is not so rapid. The palate fold reaches the fronto-nasal process behind this, and there ends, not invading the process at any time.

FIG. 11.

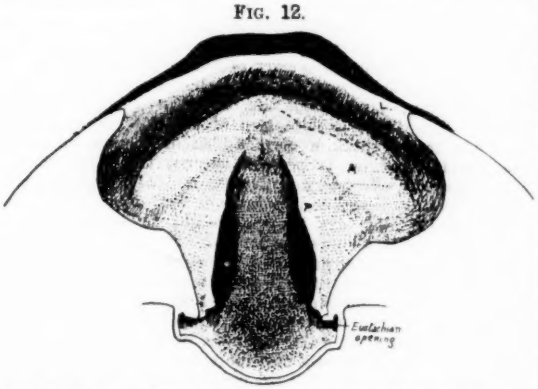


22 mm. head in sagittal section, showing the palate fold from within and the extent of the left nasal fossa.

It is convenient to deal with the general growth of the nasal cavities at this point. In the 13 mm. embryo (Fig. 9) the very small posterior nasal openings—it is of no importance whether they are actual or potential passages—are placed far forward on the roof just above the primitive palate; they are a little larger in the 16 mm. specimen. I showed a few years ago that the increase in size of the nasal cavities takes place in an upward direction, the conclusion being based on the increasing angle between the level of the roof of the cavities and the base of the skull behind the pituitary region; this angle opens out from 130° to 160° or more, while that formed with the level of the floor remains practically fixed. This means that the mesodermal walls of the cavities, growing rapidly where they lie below the level of the roof, elevate this roof without depressing the floor. The mesodermal walls of the hinder part of the small cavity of the 12 mm. embryo are maxillary in origin and form also the boundaries of the posterior opening, so in their growth *pari passú* with the paraxial portion of the walls the height of the opening is increased in an upward direction with that of the cavities. Thus, when we look at the openings in the 28 mm. embryo (Fig. 12) the difference in height is remarkable, but the addition is all in an upward direction, the lower ends of each opening still resting on the primitive palate.

An extension of this sort evidently implies that the openings enlarge upward at the expense of the roof of the mouth, so to speak. The septum is uncovered—or, more properly, discovered—by the two cavities as they grow up. Its basis is already laid down as paraxial condensations between the forebrain and the fronto-nasal process, and, as

FIG. 12.



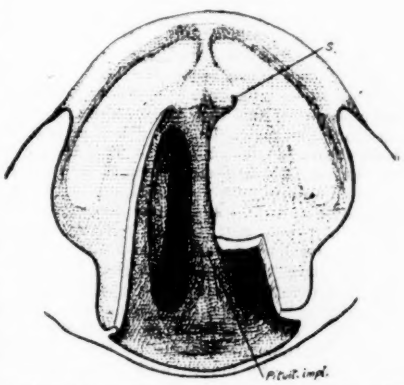
Roof of 28 mm. embryo from below. L, A, P, Labial, alveolar, and palate folds. The little tubercle at the end of the palate fold is the rudiment of the uvula; behind this the pharyngeal extension is cut away below the Eustachian opening. The interrupted line marks the position of the dental ectodermal thickening.

the cavities grow up on each side of these, they find themselves lying between the cavities. In other words, the septum is discovered and brought into existence as a necessary result of the paired upgrowth that takes place, and the free edge or back of the septum, a broad surface at first, is in the same way simply the portion of the roof of the mouth cavity which persists between the two extending openings of the cavities.

This is the way in which the septum comes into existence; there is never at any time a "downgrowth of the septum" in the sense of a structure growing into position into a cavity secondarily, nor is any downgrowth added to the septum made in the way described, and accounts of its formation based on the conception of a downgrowth are not in accord with the facts.

The growth of the maxillary mesoderm that surrounds the posterior opening and forms the hinder part of the cavity leads to the back and lower parts of both walls of each cavity being composed of tissue of maxillary origin. This mode of growth of the hinder portion of the early cavity seems to me to offer an explanation of those cases of so-called congenital occlusion of the posterior nares in which an obliquely directed thick septum, sometimes bony in parts, extends upwards and backwards from the anterior part of the palatal floor of the cavity. It is easy to imagine how some fault in the preliminary processes leads to the seat of active growth being situated above rather than below the level of the openings, so that these are left behind, so to speak, in the course of the growth, and a solid layer of maxillary tissue represents or takes the place of the opening, lying in the plane of the early roof of the mouth. The attachment of a septum of this sort, so far as I can gather from the descriptions given of them by pathologists, seems to me to be quite in accordance with the view that it represents a maxillary growth of this region which has failed to carry the opening with it in its extension.

FIG. 13.



A schematic drawing founded on a specimen in which the palate had just closed, to show the disposition of the folds. On one side the fold has been cut away at its base, on the other side a portion is left *in situ*, showing how it closes across to the middle line, behind the fronto-nasal region, to meet its fellow and fuse with the back of the septum. This part is the hard palate; the soft palate is indicated partly cut away behind this. The definitive posterior nares are seen to be the upper parts of the long opening that exists before the palate closes. s marks the position of Stenson's canal at the angle of junction of palate fold with fronto-nasal process.

In a general sense, then, we can look on the human nasal fossa as coming into its proper state and size from below upwards and backwards, and the formation of the cartilaginous nasal capsule is on the same lines. Reconstructions of the capsule at various stages show that chondrification takes place and extends in this direction, preceded by mesenchymal condensation. Chondrification may be looked on as evidence of attainment of the desired position and relations, and occurs last at the upper part when this comes into position in the base of the skull.

The extension of the nasal fossæ reaches its end about the ninth week, and the epoch is marked by the complete chondrification in its walls and by the closure of the palate folds behind it. By this time the posterior openings are very long (Fig. 13), extending from the primitive palate to the level of the top of the cavity of the mouth, and when the palate folds meet they fuse with the lower two-thirds to three-quarters of the free edge of the septum, thus closing the corresponding extent of the openings and constituting new floors for the cavities here. The upper one-quarter or so of the edge of the septum remains between the corresponding upper parts of the openings, which now constitute the definite posterior nares. Thus, the posterior nares are only part of the elongated posterior openings that await the closing of the palate, and these are in their turn but extensions of the primitive choanæ of the earlier stages.

THE PALATE FOLDS AND THEIR CLOSURE.

The palate folds can be said to form an inner edge to each maxillary process. They are apparent in their posterior parts in the 12 mm. embryo (Fig. 7) as rounded folds

between the front portions of the tubo-tympanic recesses and the mouth cleft separating the mandibular and maxillary processes. They are quite well marked in their entirety in the 16 mm. embryo (Fig. 10), and their further growth can be seen in the 22 mm. and 28 mm. specimens (Fig. 12). At 22 mm. the inner view of the palate shows a flat vertical surface (Fig. 11) which lies against a like surface of the tongue, while in the later stage this condition has been changed, the flat surface becoming hollowed in conformity with the rounded side of the tongue and the projection of the palate fold being now directed inwards and downwards and lying below the side of the mass of that organ.

This change, however, only occurs in the front part of the fold; the hinder portion, the future soft palate, being opposed to a still vertically disposed tongue, remains in a vertical position beside it. In the 28 mm. specimen, moreover, there is apparently an indication of the distinction between hard and soft palate in the appearance of the fold itself; at any rate, there is no doubt about the meaning of the small tubercle at the hinder end of the fold below the tubal opening, for this is plainly the rudiment of the uvula of that side. The new ridge that has made its appearance behind this, continuing the line of the palate fold, is a forward growth from the third visceral arch (associated with the extension of this arch in the narrowing of the Eustachian tube) which comes secondarily into relation with the maxillary palate fold proper; it forms the pharyngeal extension or posterior pillar of the fauces and need not concern us further.

The palate folds reach the sides of the fronto-nasal process by their pointed anterior extremities and extend no further. When they close across below the septum their anterior parts are folded round this process and meet behind it, as shown in the scheme in Fig. 13, leaving the process exposed between their extreme front ends. Even this exposed area is partly covered in as the folds grow larger and thicker and its surface becomes wrinkled, so that epithelial nests and pillars remain for some little time between its buried surface and the folds that overlap it. Finally, only the small area that constitutes the incisive papilla is left uncovered. Stenson's canals mark the angles of the original separation between the process and the folds. But, in order to meet below the septum, the folds must leave their position below the tongue, which occupies the cavity of the mouth and lies in contact with its roof, and must find their way above this organ; this change requires some consideration in detail.

CHANGE IN POSITION OF THE PALATE FOLDS.

Although the details of the formation of the palate have been known for about 50 years, it is only within the last 15 years or so that suggestions have been made concerning the factors which may be at work in bringing about the change in position of the folds with reference to the tongue. In this time many hypotheses have been advanced to account for the change.

W. His, the first to contribute a separate study of the question, attributed the process to the withdrawal of the tongue from the upper part of the cavity and from between the folds as the result of muscular action, both in the tongue and on the jaw, causing depression of the whole structure.

Fick, in his later views, thought that the definitive palate is not formed from the "palate folds," but from small ridges which he described, in pig embryos, situated above these. Anna Pölzl, also, looked for the explanation of the position above the tongue in the occurrence of a new growth in a higher situation, with atrophy of the original folds. But she likewise describes the tongue as growing forward out of the space between the folds, as the result of growth of the associated structures of the face and not from muscular action.

Schorr considered that the folds are opened out by a lively growth near their lower surfaces in the angles between them and the alveolar masses. At the same time the tongue is elongated and depressed, and a complicated interaction of forces between tongue and folds leads to the latter coming on to the upper surface of the tongue. Pohlmann and others have thought that the change might result from a fresh modelling of the parts, with widening of the ventral wall and curving inward of the side walls. Fuchs ascribed the change of plane of the folds to the rapid growth of the tongue, compelling it to emerge from the narrower upper part of the general cavity. Frets does not think that active muscular contraction is at all likely, but considers the change to be "the expression of tension adjustment within the tongue and between the tongue and processes."

Michio Inouye divides the phenomenon into two phases. In the first the tongue withdraws from its situation below the base of the skull and allows the hinder portions of the folds to come above it. In the second the consequent increased tension of the front parts of the folds and proportionate pressure on the tongue lead to movements of this organ and the jaw, depressing the tongue and allowing the folds to slide over it. K. Peter adopts the view of Inouye and refers the change to the withdrawal of the tongue and subsequent active contraction.

In this summary of the views held by various writers there are certain opinions which we may at once rule out of consideration. Thus, so far as concerns suggestions founded on supposed new formations at a higher level than the palate folds, the fact that such growths have never been seen is enough to condemn the views built on them. The ridges described by Fick had been known for many years before he studied them, and their ultimate fate had been pointed out by Dursy. Moreover, the difficulty of getting rid of the palate folds remains unsurmounted. No support, too, is to be found in actual observation for the hypothesis advocated by Pohlmann. Fuchs's explanation of the phenomenon could only be accepted as such, I think, under a false conception of the conditions prevailing in the mouth; it is not necessary for the tongue to descend from the back of the septum for a distance greater than the thickness of the palate folds, and to get below the folds the tongue would have to pass, at any rate temporarily, into a smaller space—if the mouth is closed, as it ought to be in a normal embryo.

The Rôle of the Tongue.

The remaining views, with the exception of Schorr's theory of the force inherent in the palate fold, centre round the tongue as concerned in the change of plane of the folds, ascribing to it in one way or another the greater share in bringing about the occurrence. The opinions which I formed on this subject while working on the development of the nose some years ago also allot to the tongue the main rôle in the undertaking.

In the early stages this organ occupies practically the whole cavity of the mouth, being in contact with the roof, and thus with the back of the septum as this comes into evidence; for, as I have shown, this is simply the part of the roof left undisturbed between the two nasal openings as they extend upward. But the tongue not only grows intrinsically, but is also carried downwards and forwards as a result of the growth and elongation of the lower jaw; so it comes about that, while it is still in contact with the greater part of the roof, its upper and back portion has come away from the upper part of the roof. The tongue is in contact normally with all the walls of the mouth, completely filling that part of the cavity in which it is contained. The direct examination of sections does not give us, I venture to think, a correct idea of the way in which the growing tongue is pressed against the neighbouring structures; the effect of dehydration and of fixing reagents appears to alter it to a considerable extent.

The palate folds are in what might be termed a subhorizontal position below the tongue. They are not vertical except in their hinder parts. A description or figure of the folds in a vertical position would indicate, in my opinion, that the section went through the region of the soft palate, or that the tongue was much shrunk or depressed as the result of preparation, or, as a whole, by the opening of the mouth accidentally or as a post-mortem change.

Here I may mention that the only figures given by Schorr in support of his views afford no indication of the condition or position of the tongue, nor have I been able to find in his account any means of forming an opinion on this matter or on the condition of the embryos. Otherwise his views are open to criticism. Not only does it seem hardly possible to imagine a force so strong in its action inside the fold that it is able to lift this up against the resistance of the mass of the tongue in position, but his area of condensation is only to be found, in my experience, in the folds which are (in my eyes abnormally) turned down, and then in that concavity of the bend where it would be strange indeed if, under the circumstances, it were not present.

His based his opinions on an embryo which he described, but I have not been able to obtain the original description. Peter, however, gives a figure of one section, and from this I would have little hesitation in considering the specimen abnormal in the sense I have indicated above. A like criticism, however, cannot be applied to Inouye's specimen.

How the Change in Position is Brought About.

The relatively small size of the folds below the tongue, compared with their thickness and general increase after they have come above that organ, is an indication that in the first situation they are compressed and their growth inhibited. Their anterior ends are very small, each coming to a point on the end of the fronto-nasal process. The tongue is carried down as a whole with the elongation of the lower jaw, and about the ninth week its tip comes behind and below the fronto-nasal process—i.e., it is carried below the level of the folds which are attached to the upper and back part of this process. The passage of the tongue between the folds here is favoured by the small size of their front ends, and now that the end of the wedge is metaphorically and almost literally introduced it seems to me easy to conceive the change of plane of the folds thus initiated going on to its complete fulfilment. Possibly the tongue may be stimulated to an irregular contraction by the change of pressures that ensue from its tip coming below the fronto-nasal region, and this may be the explanation of the condition present in one of Inouye's embryos, in which the tongue was below the fold on one side, under conditions that evidently differed from those obtaining in His's specimen. Or such a factor as want of perfect symmetry may lead to a one-sided preference in the slipping up of the folds. But, whatever view may be thought likely concerning this point, the action itself seems to me to be of minor importance, being only the individual way of carrying on the movement started by the forward growth of the tongue. Having arrived below the folds, the tongue is now necessarily at a slightly lower level in a somewhat wider space, and thus room above the organ is provided in which the folds can meet below the septum of the nose. The folds are now free to grow, and apparently do grow with considerable speed, and it is not long before they meet above the tongue. They are at first a little distance from the septum, resting on the tongue, but this structure seems to share in the opportunity for growth provided by the change of position, and soon begins to press the folds against the septum, to which they adhere.

But the tongue was not in contact with the upper part of the septum which on its lingual aspect is part of the roof, so that the folds here are not brought against the septum, but remain on the tongue, and join to form the soft palate. Thus not only the change of position of the folds, but also their attachment to the septum and the general arch of the whole palate, depend ultimately on the agency of the tongue for their existence in a mechanical sense.

The naso-pharynx is that part of the cavity left above the soft palate, brought into existence by the descent of the tongue originally, but probably enlarged subsequently and secondarily. It seems very doubtful whether it can be claimed as a derivative from the mouth cavity proper; probably it would be more correct to describe its cavity as being originally part of that of the foregut.

The portion of the mouth cavity which lies above the level of the open palate-folds is frequently termed the "cavum naso-pharyngeum" or "pharyngo-nasale," apparently (at any rate in some cases) from a mistaken conception of the developmental changes taking place in the neighbourhood. If it is understood that the whole nasal fossa is extra-oral in its formation, with all its turbinal masses and accessories, it is evident that the only portion of the cavum that is taken into the final nasal cavity lies between the margin of the nasal opening and the upturned fold which is about to close this opening. This is a negligible amount of space, and is only represented in the nasal cavity by the extreme lowest portion of the inferior meatus just above the floor and behind the anterior foramina.

THE MESODERMAL DEVELOPMENT.

Indications of the general distribution of the two mesodermal strata have been given throughout the preceding account of the formation of the roof. We have seen that the paraxial layer is thickened centrally, the thickening passing into the greater growth round the nasal and optic regions antero-laterally, and the immediate surroundings of these special sense organs are developed in this stratum. The maxillary stratum is distributed over the surface of the other, ultimately covering it completely on its inferior aspect except where the original fixed area of the primary stomodæum is developing as the pituitary body. The palate folds are purely maxillary, the primitive palate is mainly maxillary but to a small extent paraxial above this, while the maxillary tissues which cover the septal (central) portion of the roof and the margins of the two posterior openings extend from here for a considerable distance on to the corresponding walls of the nasal fossæ

The premaxillary part of the upper jaw develops in the maxillary portion of the primitive palate, and the vomer is laid down in the maxillary layer on the septum, as is also the paravomerine cartilage and (probably) the recurved portion of the cupola of the cartilaginous capsule which lies against the septum. The septal maxillary stratum here is continuous, inside the capsule and round the posterior part of the cupola, with that on the back part of the outer wall of the fossa, in which the palate bone and greater part of the inferior turbinate are formed. The maxilla and its palatine process, on the other hand, belong to the main maxillary mesenchyme outside the walls of the capsule. The details of the development of these several bones have been given from time to time by Fawcett, whose researches have become a standard reference on this matter and need not be recapitulated here.

Failure of Maxillary Growth and Causation of Clefts.

It is evident that the bones concerned in forming the visible roof of the mouth are maxillary in their origin, and all considerations seem to me to point to failure in the driving power of the maxillary growth as the great underlying factor in the causation or persistence of the common clefts of the palate and alveolus. The failure is naturally more evident in the outlying parts of its extension, the parts which reach their position late and secondarily. The real nature of this "power of growth" is, of course, at present quite beyond our ken, nor have we any clear ideas as yet about the conditions which affect it; but it seems to me quite possible—however improbable—that some means may yet be found by which this growing power may be artificially stimulated and augmented and even made available as a therapeutical adjunct.

In the neighbourhood of the primitive palate the maxillary mesoderm extends on to the fronto-nasal region by a process of invasion under the epithelial lining. There is no application of one epithelial surface to another, a sort of extension of the conditions present when the maxillary and inner nasal processes first meet, but a direct extension, into the latter region, of cells from the former process, the stratum thus formed lying superficial to the original paraxial mesoderm of the fronto-nasal process.

In the region of the lip the maxillary invasions advance from each side and meet in the middle as pointed extensions (see Fig. 10) of the layer, which enclose an angle open downwards; this rapidly closes and completes the central part of the lip. Thus, leaving out of account those cases that may be referred to absence of the fronto-nasal process, it would seem that central fissures of the upper lip indicate failure in the maxillary stratum. Normally the philtrum marks the junction of the two labial fronto-nasal extensions of the maxillary layer.

The same mode of spread serves for the extension of the alveolar[2] eminences toward the middle; it is a slower process here and allows the general shape of the underlying fronto-nasal region to show for some time through the thin covering layer (see Fig. 12). The alveolar eminences do not quite reach the middle line, but a narrow tract between them connects the labial ridge with the area between the palate folds (Fig. 13). When the teeth appear the continuity of the tract seems to be interrupted and the front portion remains as the frenum of the lip, rendered prominent by the deepening of the alveolo-labial sulcus beside it.

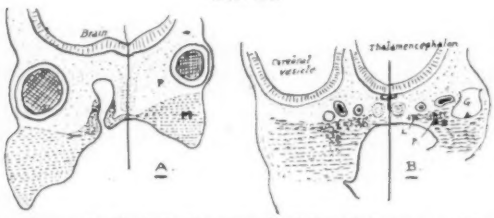
Want of time keeps me from entering on a consideration of the dentition in this region, but I may point out that the position of the line of early ectodermal thickening is shown in Fig. 12, and that it seems probable that only the central incisor is formed on the fronto-nasal region, and although

[2] This ridge, though conveniently termed "alveolar," has little to do with the formation of the permanent alveolus. It appears to be connected more with the base of the palate fold than with the sockets of the teeth, which are formed to its outer side.

the lateral incisor may be placed over the situation of the original junction between this and the maxillary process, yet it is not improbable that this may be a situation which it acquires secondarily.

The position of a complete cleft in the alveolar region would necessarily be between the fronto-nasal and maxillary processes. A double complete cleft, if originally complete and due to the total failure of the maxillary process to bridge the chasm, would imply the absence of any maxillary tissues in the so-called "separated premaxilla," save that reaching it from behind along the septum. Under these circumstances interest centres round the nature of the bony structures found in the separate fragment. It must be remembered that an incomplete cleft may be complete so far as maxillary mesoderm is concerned, the connexion only persisting between the paraxial nasal folds. On the other hand, a cleft or fissure may have had maxillary tissues bridging it to some extent at one time, subsequently giving way, as Keith has pointed out, and thus a maxillary basis of some sort may be present in an apparently separate portion attached to the

FIG. 14.



Two schemes to illustrate the general relations between paraxial and maxillary strata in (A) the middle and (B) the hinder regions of the roof. In both the left side is supposed to indicate a later stage than the right. In A, P and M are the two strata; in B, L and P are the early lingula and pterygoid respectively; and G is the Gasserian ganglion. Palate folds and tongue are not shown.

septum. Such varying circumstances must be taken into account in any effort to place the bones found in the fragment, for they may theoretically be of modified maxillary or modified paraxial nature. It is rather fascinating to think of the possibility of past powers of the paraxial mesoderm coming to life again when the maxillary super-stratum is removed—a revival of lost industries which have faded under the peaceful penetration of the external growth, to illustrate the process by a metaphor which comes home to us directly in these days.

In the intermediate portion of the roof the conditions might be represented as in Fig. 14, A. The paraxial layer is thick, especially in the middle, where the condensation of the central bar is apparent. Below this the maxillary mesenchyme forms a lateral mass on each side, below the paraxial surroundings of the eye, and thins away toward the middle where it lies below the central bar. Later, as the nasal cavities grow upward and backward, this region is modified as shown on the left side of the figure, and the central paraxial bar finds itself in the nasal septum. Nasal upgrowth is not so marked a feature in the mouse, and the changes, though of the same nature, are accordingly modified to some extent. In the fowl, the enormous eye and corresponding paraxial development is correlated with a comparatively shallow maxillary stratum, and the absence of upward extension of the nasal cavities leaves the central bar as an interorbital septum. The ossifications in the maxillary mesoderm have the distribution they would possess in the mammal if they occurred here before the nasal extension had taken place.

The Hinder Region of the Roof.

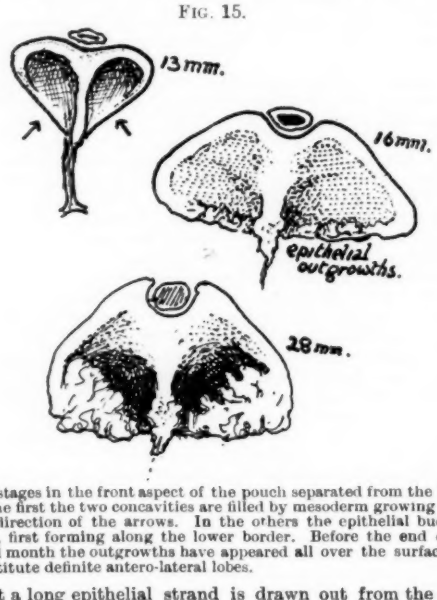
The hinder region of the roof is, from some points of view, its most interesting part. For brevity it may be described as it is illustrated in Fig. 14, B. The maxillary mesoderm is in position, and in it occurs the chondrification which signalises the appearance of the outer pterygoid plate and root of the alisphenoid, while the lingula is formed internal to these in the same stratum, and later becomes attached to the paraxial bars and to the otic capsule. It is interesting to recall that Parker, in a lecture delivered here more than 30 years ago, claimed the lingula as the representative remnant in the human skull of the parasphenoid of lower types, a contention which, I confess, seemed to me one hard to support before following its formation in the maxillary mesenchyme, the stratum in which the parasphenoid is also developed.

The inner part of the great wing is laid down first in cartilage, and the rest of this bone is not called for till the cerebral vesicles require support. This is afforded by outward extension of the great maxillary mass below each vesicle, the intervening paraxial tissues being converted into the membranes covering the wing. The development of this part goes beyond the limits of our subject, however, and it need only be said that the alisphenoid appears in its parts successively from within out. The chondral portion exists alone for a considerable time, supporting the Gasserian ganglion and its branches, and the outer part of the wing is added in membrane when it is required, all the parts being derived from maxillary mesenchyme. The details of the chondrification and ossification have been given by Fawcett in his well-known papers.

In the centre of the hinder region Rathke's pouch is at first a widely open and rather shallow recess. (See Fig. 3.) The pouch is deepened, not by upgrowth of its fixed wall, but by rapidly increasing thickness of the paraxial stratum which lies round its mouth. Thus the opening is elongated and narrowed into a stalk, while the upper part still remains as a large sac, fixed to the rounded lower angle of the forebrain at first, but soon separated from this.

The paraxial thickening forms two short but well-defined bars, one on each side of the stalk; these undergo prechondral change as distinct bars, but are later fused in a single plate of cartilage giving passage to the stalk. Later still, however, the paired nature reasserts itself in the ossification of this part, which forms the postsphenoid and is traversed by the remains of the pituitary stalk or by its canal; the situation of the canal is not between post- and pre-sphenoid, but through the former, as has been affirmed by Erdheim and Haberfeld, and lately by Cope. The stalk is implanted in the roof of the mouth below the postsphenoid bars, surrounded by paraxial mesoderm, but this part is gradually dislocated forward and elongated below the central paraxial thickening. The dislocation is associated with the growth of the central parts of the maxillary layers along the back of the septum, and possibly also with the formation of the roof of the pharynx behind it. The result

FIG. 15.



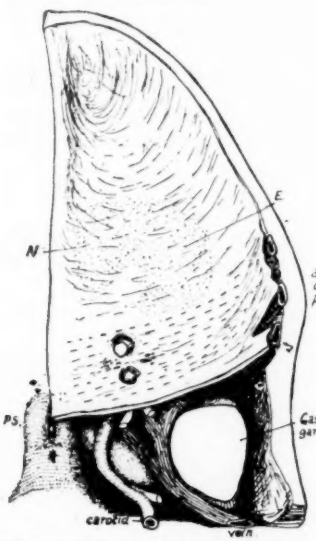
Three stages in the front aspect of the pouch separated from the brain. In the first the two concavities are filled by mesoderm growing up in the direction of the arrows. In the others the epithelial buds are seen, first forming along the lower border. Before the end of the third month the outgrowths have appeared all over the surface and constitute definite antero-lateral lobes.

is that a long epithelial strand is drawn out from the postsphenoidal region in a forward direction so far that its point of implantation becomes situated on the central part of the roof between the nasal openings—i.e., on the back of the septum (see Fig. 13), and when the palate is completed this point is just above the hinder limit of the fusion of the folds with the septum. The stretched epithelial strand disappears later, with the exception of a small fragment which persists below the sphenoid as a solid cylinder or, more frequently, a small cyst.

Development of Pituitary Body.

While these changes are going on, the uncompressed part of the pouch above the post-sphenoidal bars is undergoing conversion into the antero-lateral lobes of the pituitary body. Its front wall is separated from the apposed surface of the forebrain by ventro-lateral ingrowth of paraxial mesoderm, so that, when looked at from the front, it presents two concavities looking downwards and forwards and outwards (Fig. 15), and separated from each other by a prominent central keel. While this separation is proceeding, the true infundibular outgrowth occurs from the brain just above the upper limit of the pouch, and projects back resting centrally on its upper surface. The position of this outgrowth suggests to the observer that it comes from that part of the brain which was originally (see Fig. 1) the front end of the neural groove, and that it might have come into existence first in association with the front end of the foregut, or perhaps the notochord. It is of interest to recall researches which tend to show that Seesel's pocket, a recess of the foregut just behind the membrane, may be the remnant of a preoral gut. Thus, Kupffer described a solid prolongation of this pocket in sheep connected with the notochord, and Nussbaum, a little later, stated that this elongation in the dog comes into contact with the neural process or hypophysis, and remains in part connected with it. Bonnet also described this forward growth in the dog, showing that it has a lumen in earlier stages. We cannot afford the time, however, to speculate on this question, which is only suggested to us, in the human embryo, by the relation of the neural growth to the upper wall of Rathke's pouch.

FIG. 16.



Semi-diagrammatic view of cranial base, &c., in 13 mm. embryo. P S. Post-sphenoidal bars in prechondral state; N E. condensations round nose and eye at a deeper level, represented as showing through a semi-transparent superficial layer. A little further back the optic nerve and carotid are seen piercing this layer, and round these the condensation of the orbito-sphenoid is shown by short lines extending out over the anterior dural veins; two areas of prechondral change are shown near the nerve and artery. Further back the paraxial stratum has been removed; the prechondral mass of the external pterygoid is seen between the artery and vein, and that of the lingula between the artery and post-sphenoid bar. The great sup. petr. nerve passes below the artery, and the third and sixth are above the vein.

As soon as the mesodermal growth has freed the pouch from the apposed neural wall, the upper part of the pouch commences to grow up on each side of the infundibular process, forming a couple of hollow cornua, and this is the first true "upgrowth" to be found in its history. The antero-lateral lobes are formed by sprouts growing from its front wall into the mesoderm occupying the concavities here. The growth begins below and its area of origin extends upward, finally involving the cornua, which have by this time grown up and met over the stalk of the neural process. The lumen of the main pouch remains widely patent while these growths are appearing, and its back and upper wall is applied to the infundibular or neural lobe, which is now bulbous at its free end; the posterior wall of the pouch shows an occasional abortive outgrowth, but remains in practically all its extent as an epithelial layer applied to the neural lobe and constituting apparently the pars intermedia of Herring.

GENERAL DEVELOPMENT OF ANTERIOR PART OF CRANIAL BASE.

Fig. 16 is a semi-diagrammatic rendering of the right half of part of the model of the 13 mm. head, somewhat flattened out to exhibit the necessary structures. In the posterior part the two post-sphenoidal bars are shown, developed in paraxial mesoderm, and the stalk of the pituitary is seen between them, the developing gland being taken away with the brain. Outside this region are seen the prechondral rudiments of the inner parts of the great wing, lying in the maxillary mesoderm below the carotid artery and primary head vein, while the third and sixth nerves are passing above these vessels in the paraxial stratum. The outer part of the great wing will not be called into existence for some time to come, and its only representative probably is to be found in the sections as a maxillary mass slightly developed just to the outer side of the Gasserian ganglion.

The paraxial stratum has been removed in this area, but has been left *in situ* in front of it, and can be divided for descriptive purposes into two layers—superficial or neural, next the brain, and deep, next the maxillary stratum. The optic stalk and carotid artery are shown passing through the superficial layer near one another, and the layer is condensed round them and shows a prechondral state in two places here. The condensation extends centrally and outwards over the veins of the anterior dural plexus (Streeter), suggesting a covering formation for these veins. Evidently we have here the early rudiment of the lesser wing of the sphenoid.

Further forward the superficial layer thins considerably, and is represented in the figure as semi-transparent, so that the underlying condensations round the eye and nose are apparent through it, situated at a lower level in the deep layer. These condensations are continuous at their upper parts, the connexion being also visible on the outer surface of the head.

As the nasal cavities grow upwards and backwards the deep condensations are brought up towards the level of the lesser wing. As they get into position the connecting mesenchyme between them comes against the lesser wing, and the cartilaginous spheno-orbital plate is formed in it; this disappears later and is replaced by the orbital plate of the frontal. The superficial layer covering the condensations forms the immediate coverings of the brain.

Thus we see that the base, as far back as and including the lesser wing, is formed in paraxial mesoderm, but, behind these wings, the paraxial stratum has been thinned out and carried back to provide the membranes of the tentorium, &c., leaving the maxillary stratum to supply the bony support for the temporo-sphenoidal pole in the interval between paraxial lesser wing and paraxial otic capsule. In other words, the great wing of the sphenoid ought, from its origin, to be included among the bones of the visceral skeleton which help to build up the complete skull.

EDINBURGH FACULTY OF MEDICINE: THE ADMISSION OF WOMEN.

—The Senatus Academicus of Edinburgh University decided at their meeting on June 29th to recommend to the University Court that the classes in the Faculty of Medicine should be open to women. The new Principal, Sir James A. Ewing, presided over the meeting, which was attended by a majority of the members, nearly 40 being present. Up to the present the University has offered a medical qualification to women without taking any responsibility for their education, which has to be obtained in an extra-mural institution. There are now 170 students at the Women's School of Medicine at the Surgeons' Hall, over 60 of these having entered during the past year. The accommodation at the school is overtaxed, while the depletion of the attendance at the University classes owing to the war leaves plenty of room there. It is known that a number of professors in the University are favourable to the admittance of women to the medical classes, and opposition to the scheme is based more on the fear of an innovation and its practical working than upon any question of principle. It is suggested that the introduction of women might tend to reduce the number of male students. Another difficulty which has been raised is the possible shortage of clinical material, since there is only one large infirmary in the city, but it is thought that Leith Hospital and the county hospitals might be made available.

AN INVESTIGATION INTO SOME OF THE

EFFECTS OF THE STATE OF NUTRITION OF THE MOTHER DURING PREGNANCY AND LABOUR ON THE CONDITION OF THE CHILD AT BIRTH AND FOR FIRST FEW DAYS OF LIFE.

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THIS investigation embodies the results of an attempt to estimate some of the effects of the state of a mother's nutrition during pregnancy and at the time of labour on the condition of her child at birth and during the first few days of life, as deduced from statistics obtained from the lying-in hospitals of London and Dublin. The total number of cases investigated was 6162, of which 3721 represented hospital experience in London and 2441 similar experience in Dublin. The method adopted to obtain the statistics was to send out a number of printed cards to the hospitals, on each of which were entered the particulars of one case by the resident medical officer or registrar of the hospital. The cases were not selected in any way. The information thus obtained has been carefully classified and arranged to enable certain conclusions to be drawn if possible.

The most difficult thing in the investigation has been to determine what was the state of a mother's nutrition, so that comparisons might be made between different cases. An attempt has been made to arrive at this in three ways.

1. The weights and heights of the patients have been taken soon after they came to the hospitals and before delivery. From these data tables were constructed showing the average weight of a mother for any given height, the London and Dublin mothers being treated separately, because it was found that the women of these two cities showed a distinct difference in this respect. A similar height and weight ratio was also taken after excluding all those cases which were shown by criteria 2 and 3, mentioned below, to be in a state of either extremely good or extremely bad nutrition, but the average figures so obtained differed so little from those obtained by the first method that the state of nutrition, so far as this criterion is concerned, has been deduced from the former tables only. Unless there were at least 50 women of any given height from whom the average weight could be computed, the cases were discarded as useless for the purpose of this investigation. The maximum number of women of any given height in London in the series under examination was 580, with a height of 5 ft. 2 in., and in Dublin 325, with a height of 5 ft. 2 in. The average figures obtained in this way were checked by comparing the weights at labour of 52 women with their weights two months later, when involution was presumably complete. In this way the average loss of weight was ascertained, and by adding this amount to the average weight for any given height of a woman in ordinary circumstances, as given in Hutchison's tables, a result was obtained which agreed very closely with the average figures obtained from the cases weighed at the time of labour. It may be noted in passing that the women whose state of nutrition was good according to criteria 2 and 3 appeared to lose more weight during the puerperium than did those whose state of nutrition was bad according to the same criteria, but the total number investigated in this way was too small to allow any certain conclusion to be drawn on this point.

2. The second way in which an attempt was made to arrive at the state of nutrition of a woman at the time of labour was by getting the medical officer in charge of her to record his impression as to whether this was good, average, or bad on the card referring to her case.

3. The third way was by having recorded on the cards each woman's own account of the amount of food she had been able to obtain during her pregnancy as being good, average, or bad.

It was noticeable that a large percentage of those women whose state of nutrition was bad according to criteria 2 and 3 could not be weighed and measured when they arrived at hospital, owing either to the advanced state of labour or to some complication, such as accidental hæmorrhage. Cases in which the malnutrition was due to disease have been excluded.

As regards the height and weight ratio, those cases have been classed as good whose weight exceeded the average weight of women one inch taller; those cases as bad whose weight fell short of the average weight of women one inch shorter; all other cases have been classed as average. It will be seen from the figures that the number of cases with average nutrition, as tested by this height and weight ratio, is smaller than that of those with either good or bad nutrition. This, of course, means that many average cases are included in the good and bad classes, and the effect is to understate rather than overstate the conclusions drawn from the good and bad classes; but if the average class had been enlarged by using a different method the number of cases with bad nutrition according to all three criteria would have been so small as to be valueless.

In the light of the above three criteria of the state of a woman's nutrition all the cases available have been divided into classes as follow:—

A 3, Cases in which the height and weight ratio, the observed state of nutrition, and the nutritional history are all bad.

B 3, Cases in which the height and weight ratio, the observed state of nutrition, and the nutritional history are all average.

C 3, Cases in which the height and weight ratio, the observed state of nutrition, and the nutritional history are all good.

A, Cases in which the height and weight ratio is bad.

B, Cases in which the height and weight ratio is average.

C, Cases in which the height and weight ratio is good.

In this classification it will be noticed that most stress is laid on the height and weight ratio.

Influence of the State of Nutrition of the Mother on the Death of the Child during or before Labour.

The percentage of dead births in the case of women of bad nutrition (A 3) was 7·7 per cent. out of a total of 65 cases. If all the cases suffering from accidental hæmorrhage could have been weighed and measured, the percentage would probably have been still higher. In the class of average nutrition (B 3) the dead births are 1·1 per cent. out of a total of 183 cases. In the class of good nutrition (C 3) the percentage is 1·9 for 860 cases. It is noticeable that though the class of lowest nutrition has by far the highest percentage of dead births, the class of average nutrition has a lower percentage than the class of good nutrition. This may be due to the increased weight of the babies in the class of good nutrition (*vide infra*). It has to be observed, however, that the last-named class is much larger than the two others. When the height and weight ratio alone is considered, the dead births are 2·1 per cent. for 2280 cases of bad nutrition, 1·1 per cent. for 978 cases of average nutrition, and 1·7 per cent. for 1824 cases of good nutrition, again a rather higher percentage for those of good than for those of average nutrition.

Influence of the State of Nutrition of the Mother on Prematurity of Labour.

In considering these figures it must again be remembered that many mothers with accidental hæmorrhage could not be weighed and measured. Here 11·9 per cent. of 59 labours were premature in the class of bad nutrition (A 3). In the class of average nutrition (B 3) 2·7 per cent. out of 183 cases. In the class of good nutrition (C 3) 1·3 per cent. out of 848 cases. For cases grouped by the height and weight ratio alone, when the mothers' nutrition was bad, 5·3 per cent. were premature out of 2225 cases; when it was average, 2 per cent. out of 960 cases; and when it was good 2·7 per cent. out of 1795 cases.

Influence of the State of Nutrition of the Mother on the Weight of the Full-time Infant at Birth.

For this purpose the birth weight has been considered to be above the average if it exceeded 8 lb., to be of average value if between 6 lb. and 8 lb., and to be below the average if below 6 lb. In the class of bad nutrition (A 3) out of 50 babies 10 per cent. were above and 14 per cent. below

the average weight. In the class of average nutrition (B 3) out of 177 babies 12·4 per cent. are above and 11·3 per cent. are below. In the class of good nutrition (C 3) 40·1 per cent. are above and 3·1 per cent. below out of 836 babies. In this case a state of maternal nutrition above the average seems to have a very marked effect in increasing the baby's weight, whereas a bad state of nutrition on the part of the mother has less effect in decreasing it than might have been expected, since the figures for the class of bad nutrition and for that of average nutrition are not very widely removed from one another. When the height and weight ratio alone is taken into consideration, out of 2108 babies of mothers with bad nutrition 17·7 per cent. were above the average weight and 11·8 per cent. below; out of 943 babies of mothers with average nutrition 23·4 per cent. were above and 8·1 per cent. below; and out of 1839 babies of mothers with good nutrition 34·6 per cent. were above and 4·1 per cent. below.

Influence of the State of Nutrition of the Mother on Post-natal Mortality of Infants.

Out of 3693 babies born in the London hospitals 2·1 per cent. died during the first ten days of life. If, however, those cases are excluded to which the height and weight ratio could not be applied, in which the mother's malnutrition was due to disease, or in which the baby died as the result of injury, malformation, or syphilis, there remain 3015 babies, of whom 1 per cent. died. As contrasted with this, out of 45 babies born in London of mothers with bad nutrition (A 3) 6·66 per cent. died; out of 184 babies of mothers whose state of nutrition was average (B 3) 0·5 per cent. died; and out of 328 babies of mothers with good nutrition (C 3) 0·3 per cent. died. Where the height and weight ratio alone was bad the death-rate was 1·3 per cent. for 1177 babies; where it was average 0·5 per cent. for 589 babies; and where it was good 1 per cent. for 1249 babies. In the Dublin hospitals during the first eight days of life the death-rate for all the 2439 babies was 2·5 per cent., and for the 1708 cases which could be classified 0·3 per cent. On the other hand, the death-rate for the 12 Dublin babies of mothers with bad nutrition (A 3) was 8·3 per cent.; where the mother's state of nutrition was average (B 3) none of the 8 babies died; where it was good (C 3) 0·8 per cent. of 512 babies died. When the height and weight ratio alone is considered, 0·9 per cent. of 934 babies of mothers with bad height and weight ratio died; 0·4 per cent. of 241 babies born of mothers with average height and weight ratio; and 0·8 per cent. of 533 babies born of mothers with good height and weight ratio.

Influence of the State of Nutrition of the Mother on the Progress of the Child after Birth.

For the purpose of ascertaining the progress of the babies after birth their weights on the tenth day in the case of London babies and on the eighth day in the case of Dublin babies (since the Dublin babies were not, as a rule, kept in hospital after the eighth day) have been compared with their birth weights, and the change in weight has been contrasted with the average weight curve given by Holt.[1] The condition has been labelled "satisfactory" if the progress has been equal to or better than that shown on this curve. In all other cases it has been labelled "unsatisfactory" or the death of the child has been recorded. Separate tables have been made out for those babies who were fed entirely on the breast, for those who were fed entirely artificially, and for those fed partly on the breast and partly artificially (mixed fed). Those cases have been excluded in which the mothers' malnutrition was due to disease, and those in which the baby died or failed to thrive as the result of injury, malformation, or syphilis. Twins also have been excluded. Premature babies have been tabulated separately, but they were too few in number to afford data for conclusions of any value.

To take first the *full-time babies fed entirely on the breast*, in the London hospitals there were 25 babies of mothers with bad nutrition (A 3); of these, 64 per cent. progressed satisfactorily and 36 per cent. failed to thrive. None died. When the mothers' nutrition was average (B 3), out of 108 babies 61·1 per cent. flourished, 38 per cent. failed to thrive, and 0·9 per cent. died. When the mothers' nutrition was good, out of 251 babies 70·1 per cent. flourished, 29·9 per cent. failed to thrive, and none died. When the cases are classified by the mothers' height and weight ratio alone, of 818 babies born in London of mothers whose height and weight ratio was bad, 65·9 per cent. flourished, 33·7 per cent. failed to thrive, and 0·4 per cent. died. When the mothers' height and weight ratio was average, out of 418 babies 62·2 per cent. flourished, 37·5 per cent. failed to thrive, and 0·2 per cent. died. When the height and weight ratio was good, of 836 babies 63·2 per cent. flourished, 36·6 per cent. failed to thrive, and 0·2 per cent. died. The Dublin cases in the classes of bad and average nutrition were so few that conclusions can hardly be drawn from them. Moreover, it is noticeable that mixed breast and artificial feeding seems to be resorted to much more readily in London, when the baby does not seem to be thriving, than in Dublin. Possibly this is partly due to the fact that the London babies stay longer in hospital, so that their progress can be better gauged.

To the figures for the *full-time babies fed partly on the breast and partly artificially* the same criticisms, of course, apply, and the Dublin cases are so few as to be almost valueless. There were only 9 full-time babies of this kind in London whose mothers' nutrition was bad (A 3). Of these, 33·3 per cent. flourished, 55·5 per cent. failed to thrive, and 11·1 per cent. died. When the mothers' nutrition was average (B 3), out of 66 babies 42·4 per cent. flourished, 57·6 per cent. failed to thrive, and none died. When the mothers' nutrition was good (C 3), out of 58 babies 32·8 per cent. flourished, 67·2 per cent. failed to thrive, and none died. Of the London babies, when the mothers' height and weight ratio was bad, 30·4 per cent. flourished, 68·4 per cent. failed to thrive, and 1·3 per cent. died out of 237 babies. Similarly, when the height and weight ratio was average, the figures are 35·9, 64, and 0 per cent. for 142 babies; and 30·3, 69·4, and 0·3 per cent. when the height and weight ratio was good.

The numbers of the *full-time babies who were fed entirely artificially* were too few to allow of any useful deductions being drawn.

With regard to the *infantile death-rate before lactation was established* the combined figures for London and Dublin give 51 babies whose mothers' nutrition was bad (A 3) with a death-rate of 2 per cent., 184 babies of mothers with average nutrition (B 3) with a death-rate of 0, and 827 babies of mothers whose nutrition was good (C 3) with a death-rate of 0·2 per cent. When the height and weight ratio alone is considered the death-rate was approximately the same for all classes.

From the foregoing figures it does not appear that the state of nutrition of the mother at the time of labour and during her pregnancy has any marked influence on the progress of "mixed-fed" and breast-fed babies during the first eight or ten days of life. On the other hand, the death-rate of babies before lactation is established may perhaps be higher when their mothers are really badly nourished. It must be remembered that from the time of labour until their discharge from hospital all the mothers were presumably receiving an ample diet.

Influence of the State of Nutrition of the Mother on her Capability of Suckling.

The percentage of breast-fed babies is very much higher in Dublin than in London, and this quite apart from the question of mixed feeding, since the percentage of artificially fed babies—that is of mothers who had no milk at all—is much higher in London than in Dublin. Both in London and in Dublin, however, the state of the mother's nutrition does seem to have a definite influence on her capability of suckling. Of a total of 3638 babies born in London 73·21 per cent. were breast-fed, 24·32 per cent. were mixed-fed, and 2·47 per cent. artificially fed. Of 2352 Dublin babies 98·51 per cent. were breast-fed, 1·23 per cent. were mixed-fed, and 0·25 per cent. artificially fed. These figures exclude babies who died before lactation was established and those who were not breast-fed owing to extraneous causes, such as tubercle, syphilis, sepsis, sore nipples, illegitimacy, &c. Of the 38 babies in London whose mothers' nutrition was bad (A 3), 65·8 per cent. were breast-fed, 28·4 per cent. mixed-fed, and 5·3 per cent. artificially fed. These figures have to be compared with 62·7, 36·7, and 0·6 per cent. for 158 babies whose mothers' nutrition was average (B 3); and with 79·5, 17·9, and 2·5 per cent. for 318 babies whose

[1] Diseases of Infancy and Childhood, second edition, 1903.

mothers' nutrition was good (C 3). Of 11 babies in Dublin whose mothers' nutrition was bad (A 3), 72·7 per cent. were breast-fed, 18·2 per cent. mixed-fed, and 9·1 per cent. artificially fed. All 7 babies whose mothers' nutrition was average (B 3) were breast-fed. Of 499 babies whose mothers' nutrition was good (C 3), 99·6 per cent. were breast-fed, 0·4 per cent. mixed-fed, and 0 artificially fed.

Influence of the Mother's Capability of Suckling on the Mortality and Progress of the Child after Birth.

Out of 2539 full-time breast-fed babies in London progress was good in 64 per cent., bad in 36 per cent., and 0·1 per cent. died. Similarly, for 2170 Dublin babies the percentages are 56 2, 43·7, and 0·2. For mixed-fed babies in London the figures are 816—30·4, 70, and 0 per cent.; in Dublin 20—15, 80, and 5 per cent. Here, again, is seen the greater readiness to adopt mixed feeding in London than in Dublin. As regards artificially fed babies the figures for London are 81—17·3, 81·5, and 1 2 per cent.; for Dublin 16—12·5, 87·5, and 0 per cent. The same effect was evident in the case of premature babies. These figures only express the well-known relative advantages of breast feeding, mixed feeding, and artificial feeding.

General Conclusions.

The foregoing statistics do not absolutely prove anything, but they seem to suggest the following conclusions.

A state of bad nutrition of the mother at the time of labour due to insufficient food (1) greatly increases the percentage of dead births; (2) greatly increases the percentage of premature births; (3) slightly decreases the average weight of the full-time baby at birth; (4) definitely increases the post-natal infantile mortality; (5) has little, if any, effect during the first eight or ten days on the progress of babies who live during that time; and (6) possibly increases the death-rate of babies during the first three or four days of life.

A state of good nutrition of the mother at the time of labour, on the other hand, (1) considerably increases the average weight of the full-time baby at birth; and (2) increases the percentage of mothers who are able to suckle during the first eight or ten days of the puerperium, quite apart from any effect from the use of an ample diet during this time.

The figures also suggest that on the whole a state of average nutrition of the mother is the most favourable condition.

My best thanks are due to the following medical officers for their help in the collection of these statistics: Dr. Sydney Vosper, Dr. Rutherford Smith, Dr. Weston, Mr. J. van Schalkwijk, and Mr. Lionel Colledge, of the British Lying-in Hospital; Dr. J. D. Barris, of the City of London Lying-in Hospital; Dr. E. S. Cooke, Dr. M. D. Hancock, and Dr. Ievers, of the Clapham Maternity Hospital; Dr. A. Lionel Smith, Dr. G. N. B. Sebastian, Dr. P. F. Wilson, Dr. Dudley Corbett, and Dr. W. L. Pink, of the General Lying-in Hospital; Dr. Clifford White and Dr. J. B. Banister, of Queen Charlotte's Hospital; Dr. V. J. McAllister, of the Coombe Lying-in Hospital, Dublin; and Dr. Bethel Solomons and Dr. J. R. Freeland, of the Rotunda Hospital, Dublin. I am much indebted, too, to the committees of management of the foregoing hospitals for their kind permission to collect and publish the statistics contained in this investigation.

Grosvenor street, W.

CENTRAL MIDWIVES BOARD FOR SCOTLAND.—The Board was finally constituted on June 27th by order of the Privy Council. The names are the same as those provisionally appointed and announced in our issue of Feb. 12th, p. 366, with the addition of Miss Alice Helen Turnbull and Miss Isabella Lewis Scrimgeour, appointed by the Lord President of the Council.

A FREE CONVALESCENT HOME FOR DELICATE CHILDREN.—A convalescent home has been opened at "Woodbine," Sidmouth, Devon, for delicate children of needy naval and military officers and others whose incomes have suffered in the present war, by Mrs. Cowley, wife of Mr. A. E. Cowley, D.Litt., sub-librarian of the Bodleian Library, Oxford. The children must be between the ages of 5 and 10 (or 5 and 8 in the case of boys) and are to stay for a period of four weeks. The house is situated four minutes from the sea and is in charge of a competent matron and nurse. The stay in the home is entirely free of charge and travelling expenses are also defrayed by Mrs. Cowley, to whom application should be made at 94, St. Aldates, Oxford. A doctor's recommendation should accompany the application.

A REPORT ON THE

CASUALTIES FROM THE JUTLAND COAST ACTION RECEIVED AT ROYAL NAVAL HOSPITAL, SOUTH QUEENSFERRY.

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THIS hospital received 110 badly wounded cases, comprising—shell wounds, 62; burns, 42; suffering from the effects of fumes, 4; and from severe shock, 2.

The shell wounds were for the most part multiple; some cases had as many as 20 different lesions, varying from compound fractures to small punctured wounds caused by shell splinters. Almost without exception these were markedly septic on arrival, being less than 48 hours after injury, in spite of the fact that excellent treatment had been administered on board ship. For the greater part the injuries were to limbs. In 3 cases only were the eyes affected; in one the eye was entirely disorganised and septic, enucleation being necessary; another was an incised wound of the sclerotic about half an inch long at a tangent to the corneo-sclerotic junction; the third was a shell splinter which had perforated the lower lid and become embedded in the sclerotic coat. On removal it left an ulcer which quickly cleared up. Considering the confined space and the power of the high explosives, it is remarkable that there were so few eye lesions. Of abdominal lesions there were 3 also; 2 of these were suffering from severe wounds elsewhere and survived a short time only; the other man had a perforated wound with local peritonitis, but is doing extremely well at the time of writing.

Fractures were numerous, for the greater part compound—in fact, a simple fracture was rare; some patients had as many as three compound fractures. Some, again, had one or two inches of bone and large masses of muscle missing, vessels and nerves being exposed. All wounds were very septic. In many cases amputation was the only resort. All our amputations were performed by the circular flapless method. To quote Captain M. Fitzmaurice-Kelly, R.A.M.C.: "It saves life, length of limb, and the risk of secondary hæmorrhage is lessened. It arrests the spread of infection, and it is possible where no other method is possible."[1]

The prime object in the treatment of these cases was to combat the sepsis. One of us used eusol, the other favoured continuous saline irrigation, and the results up to the present have been equally successful. Both have their advantages. Undoubtedly eusol is an excellent application in very early cases—in fact, second to none; but when once sepsis has gained a footing continuous saline irrigation seems to meet the requirements, does away with painful dressings, and is particularly non-irritating to the injured and exposed periosteum, which is so easily destroyed by the application of antiseptics. Again, in these cases secondary hæmorrhage is a very real danger, and is much more likely to occur from the frequent application of dressings than with a continuous irrigation; also we consider that, much as eusol stimulates the growth of granulation tissue, saline stimulates it more. We have observed that the granulation tissue produced by saline does not bleed so profusely on the slightest touch as that produced by eusol.

We endeavoured as much as possible to avoid wiring or plating such septic fractures, but in one case this was necessary, as in no other way could the fragments be kept away from the popliteal vessels. As we have pointed out before, the adequate treatment of sepsis is the primary indication; therefore a splint which admits of easy approach as well as effective immobilisation is essential. In cases of fractured humerus we found a Thomas's knee-splint with extension met both these requirements, especially as the men we had to treat were of fine physique. Compound fractures around the wrist- and ankle-joints were immobilised in metal splints and immersed in continuous saline baths.

[1] British Journal of Surgery, vol. iii., p. 676; THE LANCET, Jan. 2nd, 1915, p. 15.

The ordinary wooden splints, such as anterior and posterior splints for the forearm, back splint with foot-piece and side splints for the leg, were quite useless, as all the cases had multiple wounds which required the removal of splints for dressings and would not allow pressure being applied.

As regards *burns*, these were plentiful and extensive. Since these were due to sudden flashes, it was rare to find a burn of more than a third degree, and equally rare to find them affecting other parts of the body than the hands and face — i.e., the exposed parts. Any burn which is later found to be more than the third degree is generally due to the application of dressings. With removalof dressings a thin superficial layer of granulation tissue epithelium is also removed; if this is continued it is easy to explain why burns become deeper. In our opinion the treatment of burns should be expectant as well as immediate. This treatment is not new-fangled, nor is it a war "fad." We have used it in civil practice before, chiefly in young children; we used it in the cases from the Dogger Bank action with equally excellent results.

FIG. 1.

Cordite burn of face. A. B. at commencement of treatment.

FIG. 2.

After three weeks' treatment.

The stages of burns are: (*a*) Stage of shock; (*b*) stage of sloughing; (*c*) stage of separation of the slough; (*d*) stage of scarring. On receipt of a case of burns the immediate treatment is obviously to treat shock. Treatment can be summed up briefly—rest, warmth, and morphia; local treatment as for any other septic burn. We open any blebs and apply picric acid; this is both antiseptic and anæsthetic. If possible, instead of this we immerse the patient in a warm saline bath, especially if the body is affected. If shock is very marked, we give a continuous saline with a small amount of adrenalin in it. Injection of posterior lobe of pituitary body or citrate of ergot is equally good, but acts for a short time only; strychnine and alcohol we avoid. If picric acid has been used, this is left on until shock has completely passed off. Now immediate treatment must give place to expectant treatment.

Speaking of expectant treatment naturally proposes the question, What are the complications? In the first stage shock is the all-important factor; this we have already fully dealt with. In the second stage we have to treat sepsis and prevent internal complications, such as bronchitis, diarrhœa and vomiting, duodenal ulcer, &c. In the treatment of sepsis we use chiefly hypertonic saline solution for burns of the extremities, if possible as a bath, as this serves the double purpose of keeping away air and cleansing the wound. To the face, if it is impossible to apply a continuous saline douche so as to cover completely the whole surface, we apply an oil consisting of menthol, 2 gr.; eucalyptus oil, 3 min.; carron oil to the ounce. We on no account apply a dressing; the oil is applied from a bowl kept at the bedside, from which it is carried to the face on cotton-wool. This is applied at frequent intervals, the eyes at the same time being irrigated with boric lotion. At least three or four times a day the face is slightly sponged with saline so as to remove any pus which may be present and the greater part of the oil. This ensures that the oil is kept fresh and that no pus is allowed to be imprisoned under scabs, which quickly form if this precaution is not taken. If this is done frequently it is the simplest matter, and even the slightest hæmorrhage is avoided, and above all any little islands of epithelium from which the new skin will be produced are preserved. We have found under this treatment that a burn that has been carefully examined and found to be, say, of the third degree will be no deeper when examined four or five days later.

FIG. 3.

Cordite burn of face. C. D. at commencement of treatment.

FIG. 4.

After three weeks' treatment.

We do not claim that this treatment is easy and quick; on the other hand, it requires much patience and time, but the results amply repay one. At the end of seven to ten days the wound is usually quite clean, and the epithelium is very actively growing over the granulating surface. At this stage scarlet R. ointments may be used with benefit. By this method we find that we never get the hæmorrhage in the third or "suppurating stage," and the fourth or "scarring stage" is seldom seen with burns of the depth of those caused by shell explosion or by the flash of cordite, which have been the cause of all the burns we have had to

treat. Moreover, the frequent removal of all the products of inflammation prevents the absorption of toxin or toxins, whatever it may be that causes the internal complications mentioned above. It is thus that our treatment is both immediate and expectant.

Our thanks are due to Fleet-Surgeon P. H. M. Star, R.N., for his help, and for the photographs of burns which he so kindly took for us.

SOME OF THE USES AND ABUSES OF MASSAGE.

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Now that massage is used to such a large extent in the military hospitals it seems necessary to point out some of the dangers of using it indiscriminately in all cases. Thus to give massage continuously for months to a patient with a functional paralysis would tend to keep up the disability rather than cure it, because the massage continually reminds the patient of his condition. On the other hand, where a nerve is injured and the muscles it supplies are paralysed massage is strongly indicated to prevent atrophy and contractures. The following are the treatments which I have found most successful for some of the commoner disabilities that are treated in military hospitals.

1. *Functional Paraplegia.*

In many cases these patients have a considerable amount of rigidity of the back and legs, and this prevents them from sitting up. It is perfectly hopeless to try to cure them with massage. From the start efforts should be made to teach the patient to stand and walk. At first two strong assistants are required to hold him up, and usually he cannot move one leg in front of the other. Massage and faradism should be given for the first week or two in addition to the walking exercises, in order to stimulate his muscles and persuade him that he is being helped with treatment. But these must be given up at an early date whether they succeed or not, as they tend after a time to hinder progress. Frequently the patient learns to stand and walk with assistance before the rigidity in his back has passed off sufficiently to allow him to sit up. As soon as possible he should practise walking by himself in some walking machine. Here we have two long parallel bars at such a height and such a width apart that the patient can rest his arms on them comfortably while trying to get his balance. The next stage is to learn to walk in this apparatus without using his arms for support. Finally, when made to walk in the open in all probability he will tend to walk in a circle, but with further training he should learn to walk properly. During all this time he is given exercises on his bed or in a chair for his limbs and trunk, and it is very essential for the masseuse to be always very optimistic and suggest to him in various ways that he is improving daily. It is a great mistake to try to get rid of the rigidity and restore muscular power before getting him on his feet. Massage may be continued for months with this object in view without getting any result.

2. *Paralysed Muscles.*

(*a*) *Due to nerve injuries.*—The paralysed muscles should be treated with stimulating massage and galvanism. Passive movements must be given daily to the joints to prevent stiffness, especially if splints are being worn to relax the paralysed muscles. In addition to this the slightest signs of return of power must be encouraged by giving assisted and active movements to these muscles until they are sufficiently strong for the patient to do exercises by himself. He should then continue with regular exercises until the normal power has returned.

(*b*) *Functional.*—These cases must be treated on the same lines as a functional paraplegia. A little massage and faradism at first to stimulate the muscles and suggest to the patient that he is being treated. If this fails to produce any active movement after a short time the treatment must be discontinued and something else tried. Frequently after faradism the patient finds he can do a little active movement. This can be gradually increased and developed by making him practise movements until the full power returns. The success or failure of these cases depends to a large extent on the masseuse herself. She must impress on the patient that the treatment is really effecting a cure. Other functional conditions should be treated on the same lines. Massage, if used, is merely to act by suggesting to the patient that he is being treated and recovering.

3. *Flabby Heart.*

This may either occur after a long illness, such as typhoid fever, or may be the "soldier's heart" due to overstrain. These cases respond well to graduated exercises. In the early stage when the patient is still in bed massage, in the form of kneading, to the limbs should be also given. Breathing exercises form an important part of the treatment, and the patient should be taught to breathe slowly and evenly while performing the other movements. In almost every case the pulse-rate, if rapid at first, falls during and after the exercises, and it also becomes stronger. The following is an example of a scheme of treatment ordered for a patient who is still confined to bed: (1) Six deep breaths; (2) arm kneading followed by active elbow flexion and extension (six times); (3) six deep breaths; (4) leg kneading followed by active ankle flexion and extension (six times); (5) six deep breaths. This treatment is gradually increased as the patient becomes stronger, body exercises are added, and the massage is discontinued. Finally, the patient walks up a certain number of stairs daily under the supervision of the masseuse, in addition to the other exercises.

4. *Joint Injuries.*

(*a*) *After adhesions have been broken down.*—The joint is usually swollen, stiff, and painful for the first few days. Passive movements should be commenced the following day to prevent adhesions re-forming. Gentle soothing stroking down the limb, performed by a second masseuse for five minutes before and while the joint is being moved, will often prevent painful contractions of the muscles and so allow of a freer range of movement. No forcing must be allowed. The movements should be very slow and gentle, and the limb well supported so that the muscles can relax.

(*b*) *Chronic traumatic synovitis.*—For this condition exercises are strongly indicated. Even if fluid reaccumulates they should be continued. In addition massage can be given to the joint and the muscles which pass over it, and passive movements until the full range of movement of the joint is established. The exercises should be performed twice a day. Thus for a knee-joint one would give knee flexion and extension (1) sitting and (2) standing. The former exercise will be chiefly for the anterior thigh muscles and the latter for the posterior. These exercises can be increased by fixing a weight on the patient's foot. Finally, he should do exercises with his weight on the disabled limb. These exercises should be continued until the patient can hop round the room on his injured leg. These same exercises should be given to all cases in which a cartilage has been removed from the knee before the patient returns to duty. To try to redevelop the thigh muscles with massage only is perfectly hopeless, but massage may be helpful in the earlier stages when the limb aches after very little exercise.

It will be noticed that almost all these treatments end in exercises. I consider this to be very important because muscles always atrophy after an injury in their neighbourhood. But there is another very important reason. If a patient is given massage for a long period and is not made to make an effort himself he is very liable to develop some functional disability. To take a case, a patient who suffered from bad trench feet and had been treated for about six months without being allowed to walk, began to develop a talipes varus and a tremor in his legs on active movement. He was made to walk at once and do exercises on his feet to stop this functional disability.

Finally, there are the cases which require no massage, but simply careful examination to find the cause for the continuation of the disability and then some simple treatment for it.

The following are two cases which were recently admitted to the 4th London General Hospital.

CASE 1.—The patient was admitted with a flexed hip-joint and inability to walk. He had been wounded through the lower part of the abdomen and had been treated with massage, faradism, and walking exercises for a year without result. On examination it was found that the contracted hip was apparently due to spasm of the psoas muscle through

which the bullet had probably passed. He was given stretching movements for this muscle, and in a week was walking normally.

CASE 2.—The patient had been shot in the head a year ago. He had suffered from hemiplegia and was sent here for further massage. On examination he was found to have recovered except for slight loss of sense of position. His injury was over the Rolandic fissure. He could not stand or walk, and this was apparently due to slight loss of the sense of position and fear of falling over. He is doing Frankel's exercises and learning to walk, and already in a week he has shown considerable improvement.

These examples should suffice to show that careful discrimination is necessary not only in settling which cases should be given massage, but also in deciding the exact treatment to be given.

Denmark Hill, S.E.

AN EXPERIENCE OF GALYL AT ROYAL NAVAL HOSPITAL, CHATHAM.

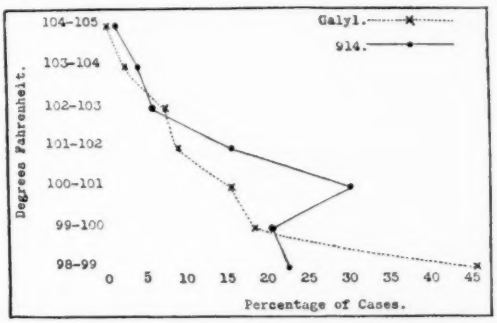
BY SHELDON F. DUDLEY, M.B., B.S. LOND., &C.,
STAFF-SURGEON, R.N.

AT the Royal Naval Hospital, Chatham, galyl has been substituted for neosalvarsan in the treatment of syphilis and about 1500 injections given. It is compared with neosalvarsan, of which drug I have had about a similar experience. The laboratory work and injections on which this article is based have all been done by myself, using the same technique with both drugs, thus eliminating personal equation in the results arrived at. 0·4 gm. galyl and 0·9 gm. neosalvarsan, the suggested equivalent doses, have been used in all the cases that have been employed to obtain the numbers below. Following the usual routine in the navy which has given excellent results with neosalvarsan, cases were given three intravenous injections of galyl at monthly intervals, with three intramuscular injections of gr. 1 of mercury after each dose of the arsenical preparation.

With regard to reaction following these two drugs, a comparison was made on the three commonest symptoms—rise of temperature, headache, and vomiting. The graph below contrasts the rise of temperature after a first injection of galyl and neosalvarsan. It is based on 583 injections of galyl and 150 of neosalvarsan. An example will easiest explain the reading of it: 30 per cent. of neosalvarsan cases may be expected to develop a temperature between 100°–101° F., whereas a similar rise of temperature is only to be expected in 15·6 per cent. of galyl cases. In the same cases 18 per cent. of those treated with galyl complained of headache, while 39·3 per cent. of those treated with neosalvarsan complained of the same thing. Vomiting followed in 3·9 per cent. of galyl injections and in 21·3 per cent. where neosalvarsan was injected. It will be seen that about half the galyl cases are followed by no rise of temperature as marked on a four-hourly chart, whereas only a quarter of the neosalvarsan cases escape without any rise of temperature. The lesser toxicity of galyl is also very evident from the few injections that are followed by headache and vomiting, as compared with those treated with neosalvarsan.

It is my experience that reactions after second and third injections of either drug are far less common than after the first—for example, in only 7·3 per cent. galyl cases, and 14 per cent. "914" cases, receiving a second intravenous injection did the temperature rise above 99° during the 24 hours following administration. Vomiting and headache are exceptional after injections subsequent to the first.

These common febrile reactions are probably caused by the liberation of the endotoxins of the treponema pallidum, otherwise one would expect them to be as frequent after the second and third doses as after the first. Another observation confirms this: 53 cases of "tertiary" syphilis were given a first injection of galyl, 40, or 77·5 per cent., had absolutely no reaction, as against 45·5 per cent. all types of syphilis. (See graph.) In a parallel series of 33



cases treated with neosalvarsan 26, or 68·4 per cent., had no reaction, as against 22·7 per cent. of all types of syphilis. This comparative freedom of late syphilis from reaction is presumably due to the fact that late lesions are often single and contain fewer and more resistant spirochætes than are present in the early generalised stages of the disease, hence less endotoxin is liberated by the drugs to cause a reaction.

As the Wassermann is essentially a quantitative test, a series of comparative positive and negative results are of little value unless absolutely the same technique with carefully standardised materials is used in both series; the reactions the table shown below is based on fulfil this condition, so are strictly comparative, if of little value otherwise.

The table explains itself, except that late secondary syphilis means cases of over a year from infection. "At start" means at the time the treatment started; "one month later," when the case has had one arsenical intravenous injection and 3 grains of mercury; "two months later," when the case has had two arsenical injections and 6 grains of intramuscular mercury.

Taking the results as a whole, neosalvarsan seems to have slightly more power in producing a negative Wassermann than galyl. It is not intended to convey the idea that these Wassermanns taken during treatment when the patient is saturated with mercury and arsenic are permanent. How far a two years' mercurial course may render them so I do not know; anyhow, I have seen many negative Wassermanns become positive a month or two after leaving off treatment, even after a two years' course of mercury.

A point the table shows well is the difficulty of obtaining a negative reaction in the late stages of the disease. In 34 galyl cases in which the reaction was negative at the start of treatment, 7 became positive at the time of the third test, whereas only 1 neosalvarsan case became positive out of 27 negative to start with. Thus, galyl used in this way and in these doses has less power than neosalvarsan to prevent the negative reactions of early cases becoming positive.

An attempt was made to compare the action of the drugs on the treponemata in the sores. Twelve syphilitic cases in whose sores treponemata were easily demonstrated under dark-ground illumination were given an intravenous injection of galyl, and an equal number of similar cases were given

—	All types of case.				Primary syphilis.				Early secondary syphilis.				Late secondary syphilis.			
Drug injected	Galyl.		"914."		Galyl.		"914."		Galyl.		"914."		Galyl.		"914."	
Total number of cases tested ...	378		150.		104.		31.		251.		110.		23.		9.	
No. and percentage of cases ...	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Positive Wassermann reactions. At start	314	83·1	123	83·0	63	60·6	19	61·3	231	92·0	96	87·3	20	87·0	8	88·9
Positive Wassermann reactions. 1 month later ...	171	45·4	61	40·6	35	33·6	10	32·3	118	47·0	45	40·9	18	78·2	6	66·6
Positive Wassermann reactions. 2 months later* ...	$\frac{63}{250}$	25·2	22	14·6	$\frac{10}{58}$	17·3	4	12·9	$\frac{46}{183}$	25·2	14	12·7	$\frac{7}{9}$	77·7	4	44·4

* Only 250 out of the 378 galyl cases have as yet had a third blood test, so the galyl figures in the last line are based on 250 cases, and the number of cases in each class is expressed in the denominator of a fraction.

neosalvarsan, and the sores were examined for treponemata 6 to 8½ hours after injection. Syphilitic spirochætes were present in 8 of the galyl cases as against 5 of the neosalvarsan cases. No spirochætes could be found in any of the 24 sores the morning following injection. I should like to note here that in two cases treated with an intravenous injection of 1 gm. ferrivine, the non-arsenical preparation recommended by Mr. J. E. R. McDonagh, treponemata pallida were easily demonstrated four days after injection. The number of cases is too few to place any reliance on, but they suggest neosalvarsan in the dose used to have a quicker treponemicidal action than galyl.

Clinically, in most cases, galyl seems to be almost as valuable as neosalvarsan, ordinary chancres and ulcerative lesions generally clearing up within ten days, but it must be confessed a few cases a month or so after injection still have the remains of a rash and more rarely an unhealed sore, an event which was exceptional in my experience with neosalvarsan. Still, it can exhibit the same dramatic cures as the older drug. The following case is an instance.

A. C——, aged 28. Admitted Nov. 7th, 1915. Contracted syphilis in May, 1915. He had extensive ulcerations of the tongue and mouth, a rupial rash, some of the lesions 1½ in. in diameter, over the whole trunk and limbs, general lymphadenitis, and anal condylomata. He was wasted, anæmic, and felt "very ill." After 0·4 gm. galyl on Nov. 10th the rupial crusts separated in four days, leaving clean granulating surfaces. On the 21st he was discharged from hospital with all lesions healed, a gain in weight of 7 lb., and feeling "quite well."

The above observations point to arsenic as the important element in these drugs. The dose 0·4 gm. galyl contains just half as much arsenic as 0·9 gm. of neosalvarsan, which probably accounts for the slightly less therapeutic effect and lesser toxicity of galyl. Perhaps the lesser toxicity has something to do with its having four benzene rings to the molecule; anyhow the following facts are striking. Inorganic arsenic, no ring, very toxic; one-ringed compounds like atoxyl, less toxic; those with two rings as "606" and "914" still less so; and four-ringed galyl probably the least toxic of the lot.

To conclude, it would seem that though excellent results have been obtained with neosalvarsan and mercury with a month's interval between the intravenous injections, this interval is unnecessarily long in the case of galyl. As the dose recommended has only half the arsenic content of neosalvarsan, the interval could be halved without any more likelihood of the occurrence of cumulative arsenical poisoning (the prevention of which is the object of long intervals), and I am sure if this was done galyl would be as good an agent in the cure of syphilis as neosalvarsan; in fact, the observations of other users of the drug have practically proved it to be so.

Since writing the above I read Lieutenant-Colonel L. W. Harrison and Captain C. H. Mills's interesting communication on ferrivine.[1] Though I only gave two intravenous injections of the drug, before deciding to leave it alone in future, the results confirm their observations. One gm. ferrivine used as supplied without further dilution was given to each of two cases of primary syphilis. Immediately following injection both men suffered from acute collapse, with a livid, sweating skin, scarcely perceptible pulse, and respiratory distress. One of the men vomited and had a reactionary temperature of 103° F. the same evening. There was, however, no thrombosis at the site of injection. One of these reactions was worse than any immediate result I have seen following over 3000 intravenous injections of neosalvarsan or galyl. (Incidentally eight galyl and three neosalvarsan injections given the same morning with the same apparatus were followed by no unpleasant symptoms.) Spirochætes were demonstrated in the serum from the sores four days after injection (they were not looked for later than this). Ten days later, as no improvement was evident and one of the men had developed a secondary roseola, 0·4 gm. galyl was given to each case. The penile sores then healed in a week.

The foregoing article is practically an abstract of a paper to be published in the *Journal of the Royal Naval Medical Service* for July, 1916, to which anyone who is interested is referred for further details.

[1] THE LANCET, June 17th 1916.

TWO CASES OF PENETRATING WOUNDS OF THE ABDOMEN INVOLVING THE INFERIOR VENA CAVA.

BY D. C. TAYLOR, F.R.C.S.,
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THE two following cases of penetrating wounds of the abdomen, complicated by tearing of the inferior vena cava, have recently come under my care.

CASE 1.—Private ——, aged 20, admitted to clearing station 12 hours after being hit by a piece of high-explosive shell. Wound of entrance tenth right rib in posterior axillary line; no exit wound. The patient was pale and had marked abdominal pain, tenderness, and rigidity. No vomiting; pulse 100; respirations 28.

Laparotomy was performed. Warm ether vapour; axillary saline. Incision through right rectus; fair amount of free blood in peritoneum. Right lobe of liver penetrated but not bleeding. A single tear 2 inches long in the greater curvature of the stomach, extending on to the anterior wall near the pyloric end, was found and sutured. The stomach was empty and no contents had been extruded. No lesion of bowel was discovered. A small retroperitoneal hæmatoma was noticed at, and on the right side of, the base of the mesentery of the small gut. A rubber tube was passed to the under surface of the liver and the rest of the incision was closed in layers. Pulse at end of operation 120. The pulse began to fail six hours later and the patient became very blanched; he died eight hours after operation.

Necropsy.—No fresh lesion in gastro-intestinal tract was discovered. There was an enormous retroperitoneal hæmatoma on the posterior abdominal wall, but little or no fresh bleeding into the peritoneal cavity. An oval hole of about the area of a threepenny-piece was found in the anterior wall of the inferior vena cava just below the entry of the right renal vein. Careful search failed to find the missile.

CASE 2.—Rifleman ——, aged 40, admitted to clearing station three and a half hours after being hit by a fragment from a bomb. Entrance wound one inch to right and half an inch above the umbilicus; no exit. A small tag of omentum was extruded. The patient was pale; pulse 120, abdomen very rigid and tender, had vomited four times.

Laparotomy was performed. Warm ether; axillary saline four hours after injury; incision through right rectus, excising track of missile; much free blood in peritoneum. Missile had passed through gastro-colic omentum, just missing the colon; two veins were bleeding; ligated. Two large tears in front loop of jejunum were found, one at the mesentery border with a small tear of the mesentery, the other at the free border of the bowel immediately opposite. Both tears were sutured. Much bleeding from the posterior abdominal wall on the right side. The intestines were packed back; a hole was found in the posterior peritoneum, just outside the line of the inferior vena cava, and a considerable retro-peritoneal hæmatoma. The posterior peritoneum was slit up with scissors, when furious bleeding took place from a hole in the anterior wall of the inferior vena cava, at and below the entrance of the right renal vein. The tear was longitudinal and three-quarters of an inch long. Bleeding was checked by placing the tip of the left forefinger in the hole in the vessel. Attempts were made to control the bleeding by compressing the vessel above and below, but failed owing to proximity of the renal vein. A pair of artery forceps was placed on the front of the cava just above the wound to produce a pleating effect, and then a series of six other artery forceps were applied from above down, effectually closing the hole, leaving the lumen of the vessel patent but narrowed. The missile was not found. The omentum was then packed around the bodies of the forceps. The abdominal incision was rapidly closed with deep salmon-gut sutures, taking up all the layers; the handles of the artery forceps were left protruding through a gap in the middle of the incision. The pulse at the beginning of the operation was 80 and the blood pressure 140; at the end the pulse was 120 and the blood pressure 80. On the first day after the operation the patient was surprisingly fit; pulse 112; vomiting at frequent intervals. Rectal salines given; urine normal. On the second day the vomiting stopped. The patient was taking fluids well; pulse 80. The bowels acted naturally; no abdominal distension; no discharge from wound; urine normal. On the fourth day warm chloroform and ether mixture was given, and the stitches above and below the forceps were removed and the muscles separated. Adhesions had formed a good firm track down to the points of the forceps. The forceps were then removed one by one, and no bleeding took place until the last pair was removed; this bleeding was trivial in amount and easily controlled with a gauze

plug. Two days later the gauze plug was removed without any further bleeding. The patient did not vomit after the second anæsthetic.

The patient was evacuated to the base on the tenth day, and a month after the injury I heard that he was doing well in England.

I have heard of other cases of wounds involving the inferior vena cava being brought to clearing stations, but I believe they have all ended fatally. The second of my two cases shows that it may be possible to save some of these patients by using forcipressure, or possibly suture in cases where the bleeding can be controlled while the suture is inserted. The reason that these cases do not bleed to death immediately is that the wounds in the posterior peritoneum and the cava are not, or do not remain, directly superimposed.

I am much indebted to Lieutenant-Colonel J. W. Longstaff, R.A.M.C., for permission to publish these notes, and also to Colonel H. M. Rigby, A.M.S., for his advice in the after-treatment of the second case.

ON THE USE OF TUBERCULIN IN GENERAL PRACTICE.

BY J. LINTON BOGLE, M.D. EDIN.,

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GRANTED the two postulates (1) that tuberculin is a useful remedy in the treatment of tuberculosis, and (2) that the use of tuberculin should not be the exclusive rôle of the specialist, but should belong to the armamentarium of the general practitioner, then notes on the main principles of tuberculin administration and hints as to the best practical means of carrying them out should be useful in inducing many medical men in general practice to commence treatment with this valuable remedy in the prevention and cure of the most generally prevalent disease in our country.

The best period to commence a course of treatment is in the early stages of the disease, at a time when only the family medical attendant is aware of its existence, and when a wise use of the proper remedies means all the difference between a vigorous and useful manhood on the one hand and a wasting and lingering malady on the other, followed too often by an early death. My experience as a tuberculosis officer has led me to conclude that amongst medical men generally there is a reluctance to venture on the use of tuberculin, based partly on the knowledge that, carelessly given, it is a potent cause of evil, and partly also on ignorance as to the proper ways and means to begin and to carry out the course of treatment. The notes are designedly simple; they are written for the instruction of those who have not hitherto used this method of treatment.

General Principles of Tuberculin Administration.

Tuberculin, if injected into the healthy, produces no symptoms whatever, but in a tuberculous subject it causes the symptoms of the tuberculin reaction. The theoretical explanation of this reaction is that the tuberculous have present in their tissues a specific antibody or lysin, capable of breaking down the tuberculin molecule with the formation of toxins. After injection these toxins are carried into the general circulation, giving rise to the symptoms of general or focal reaction, and are followed by increase in the blood of antituberculous lysin or antibody, causing a state of tolerance or increased resistance to the effects of the tuberculous poison.

In the administration of tuberculin one of two courses is followed: either (1) it is given in small doses repeated at long intervals, causing immunisation; or (2) in initial small doses, advancing rapidly to large and repeated ones, producing immunisation with tolerance. The former is the course taken in glandular tuberculous disease in children, and local tuberculosis; and the latter in autotoxic disease, or pulmonary tuberculosis. When Koch first discovered the tubercle bacillus, and introduced his preparation of "Old Tuberculin," I remember administering the remedy under the advice of a Liverpool consultant. The usual mode of treatment at that time was large and increasing doses, causing severe reactions. As a result, the remedy quickly fell into disrepute. Now the aim of the medical man is the avoidance of reactions, or their production in a very mild degree, as a valuable guide to further treatment.

Varieties of Tuberculin.

All preparations of tuberculin, whether derived from the human or the bovine bacillus, have similar curative properties. They vary, however, in their strength and character. The preparations I have generally used are P.T.O., or bovine tuberculin; T.A.F., or tuberculin albumose-free; and T., Koch's Old Tuberculin, belonging to the class of soluble extractives. Also B.E., bacillus emulsion, and P.B.E., bovine bacillus emulsion, belonging to the class of mixed products—i.e., soluble extractions, with the insoluble parts of the tubercle bacillus in addition. Their relative strength is approximately as follows, taking T. as a standard: T. = 1, T.A.F. = 1, B.E = $\frac{1}{4}$, P.B.E. = $\frac{1}{2}$, P.T.O. = 1/10.

Preparation of Dilutions.

The Record tuberculin syringe consists of a glass cylinder with a capacity of 1 c.c., or 16·9 minims, and is divided into tenths—i.e., divisions of 0·1 c.c. The syringe is filled with tuberculin to the first division, the remaining nine divisions are filled with diluent consisting of normal saline with 0·25 per cent. of carbolic acid. This is the first dilution, or Dil. A, and consists of 0·1 c.c. of tuberculin in 1 c.c. of dilution, or 1 in 10. Dil. B, or the second dilution, consists of one division or 1/10 of Dil. A, together with 9/10 of diluent; it has 0·01 c.c. of tuberculin in 1 c.c., or 1 in 100. Dil. C in like manner has 0·1 c.c. of Dil. B to 0·9 c.c. of diluent, and = 0·001 of tuberculin in 1 c.c., or 1 in 1000. Dil. D has 0·0001 c.c. of tuberculin in 1 c.c., and Dil. E has 0·00001 c.c. in 1 c.c., being respectively 1 in 10,000 and 1 in 100,000 of tuberculin in 1 c.c. of dilution. It is convenient to make these dilutions in bottles containing 10 c.c. (Sir A. E. Wright's vaccine bottles), and these bottles have rubber caps through which the needle can be plunged into the dilution without exposing it to the air.

Mode of Administration.

The usual method is by subcutaneous injection, although it is also given orally, in which case the dose is usually double that given under the skin; but as there is some doubt whether the gastric juices do not change and weaken the action of the tuberculin, the former method is the one in general use. It is to be preferred for its quick action, its accurate dosage, and also for the guidance given by the local reaction. In non-pulmonary tuberculosis the injection is sometimes made near the site of the diseased gland or joint. In oral administration the preparations used are T.R. or B.E.; they are given in a wineglassful of cold water an hour before a meal.

The Tuberculin Most Suitable for Children.

In my experience P.B.E. (the bovine bacillus emulsion), B.E., and, on account of its relative mildness, P.T.O. are the most useful preparations. They give a slow and mild reaction, and it is here that Wright's system of repeated small doses spread over a long period is so valuable. In adults, where pulmonary disease is the usual type, it is advisable to begin with T.A.F. or P.T.O. and to follow, as a second course, with B.E. The first few doses are carefully watched, but usually afterwards they can be rapidly increased until the optimum dose is reached. Some very useful guidance can be obtained by observing carefully the symptoms of the tuberculin reaction. A *local* reaction, shown by a thickening or swelling in the tissues, with some tenderness, or by redness of the skin, is a warning that the dose is being increased quickly enough, and may soon produce a general reaction. A strong *general* reaction, shown by raised temperature, sickness, shivering, headache, and malaise, and, *focally*, by signs of crepitation or hæmorrhage in a diseased lung, points clearly to the dose being too high, and it should be reduced at once.

The main guidance in treatment by tuberculin is to be obtained from a regular observance of the temperature (the opsonic index being left to experts). It should be taken twice daily, at 8 30 A.M. and 6 P.M., and recorded upon a chart. In all rises of temperature rest is the primary necessity; a week in bed is most beneficial, especially in the early febrile stages of the disease.

Dosage.

Dosage of tuberculin varies according to the type of the disease. In local tuberculosis in adults an initial dose of 0·00005, 1/20000 c.c., of P.T.O. or B.E., and in children

one of 0·00002, 1/50000 c.c., of the same preparations, are fair average commencing doses. In pulmonary phthisis a dose of 0·000002 c.c. to 0·000005 c.c. of P.T.O., B E., or P.B.E. is sufficient. The sequence of doses is more rapid at first than afterwards. At first every four days, then weekly. After the first few doses the quantity is doubled.

The two following sequences, actually carried out in cases of tuberculous disease in children, are instructive :

1. Boy, aged 10, whose grandfather and two brothers had died from pulmonary tuberculosis, was found to be suffering from tuberculous disease of the glands and bones, having one sinus in the right popliteal space, two sinuses above the right ankle, four openings in the right groin (two discharging freely), two also in the left groin; glands swollen and suppurating on left side of neck. On June 6th, 1914, the initial dose was 0·000001 c.c. P.B.E., and in February, 1915, he was receiving Dil. D, 0·00001 c.c. P.B.E., followed at intervals of two to three weeks by Dil. D, 0·2, 0·4, 0·6, Dil. C, 0·1, 0·2, 0·3, 0·4, 0·45, 0·5. 0·5, 0·6, 0·6, 0·6, 0·6. His present condition is very satisfactory; all the sinuses are soundly healed, the only remnants of extensive disease from which he suffered being some fibrous scars in the groins and two small fibrous knots on the left and one palpable gland on the right side of the neck. His general health is excellent, with an increase in weight from 4 st. 1 lb. to 5 st. 1 lb.

2. Girl, aged 12. Commencing pulmonary tuberculosis. Had lived in the same house as her uncle, who died of the same disease a few months previously. She reacted to the von Pirquet test, and showed signs of commencing disease of the right lung. During the first few injections focal reaction occurred, shown by crepitant râles, altered breath sounds, and fever. Now she has no signs, having lost her cough and other symptoms, and is also gaining in weight. Initial dose, P.T.O. 0·000002, Dil. E, 0·2, 0·4, 0·8; D, 0·1, 0·2, 0·3, 0·5 (focal reaction), 0·35, 0·25, 0·35, 0·70; C, 0·1, 0·2, 0·3, 0·4, 0·5, 0·65, 0·75.

Final dose.—The final dose of 0·1 c.c., or the whole c.c of Dil. A, is generally considered the highest safe dose—i.e., 1/10 c.c. of tuberculin and 9/10 diluent, but many medical men do not advance so far, being content with 0·5 A, or 0·75 A. In these higher doses, where the tendency to reaction is more manifest, it is also desirable to lengthen the interval, making it 10 to 14 days in place of a week; and after a few doses either to discontinue treatment for a few months or to inject a dilution of a different preparation of tuberculin of a lower strength. The initial dose of this new course may be of a higher strength than that of the first course on account of the state of tolerance established in the patient.

Errors to be Avoided.

It is necessary to remember that in passing from one dilution to another the strength is 10 times greater. Thus a sequence 0·5 D to 0·75 D is an increase of 50 per cent., but from C 0·1 to C 0·2 is 100 per cent. increase; so that on changing to a smaller injection of greater strength the increases should be small. Again, dilutions newly made are stronger than old dilutions, and the extractive toxin tuberculin dilutions are less stable than those made from the ground bacillary bodies, such as T.R. It is desirable to make fresh dilutions every two or three weeks in the former case, and every four or six weeks in the latter, or they will lose in strength.

The duration of the course depends upon the patient and the nature of the disease. A nervous patient, tending to high temperatures or hæmorrhage, requires smaller doses, and of a slowly-acting preparation, such as B E., and hence the course will be lengthened. In children, too, with glandular disease, and in all cases of bone disease, the course will be a long one, and much patience is required. In pulmonary disease of the ordinary early type the course would last from three to six months, with doses at intervals of a week. Then, after three months' rest, a shorter course of three months with another preparation of tuberculin. While undergoing this special treatment many patients can and do resume their occupations. The two following examples with their sequences of doses are interesting :—

(*a*) Young man aged 21. Pulmonary tuberculosis. Is now at work in a shed (outside) all day at his trade, the local signs having passed away. Once during my absence a dose many times stronger was given by inadvertence, with a resulting general reaction and a temperature reaching 104·2° F. Sequence: Dil. D, P.T.O., 0·5, 0·5; C, 0·1, 0·2, 0·4, 0·55, 0·75; B, 0·1, 0·25, 0·5, 0·5, 0·75 (marked reaction); B, 0·1, 0·2, 0·3, 0·4, 0·5, 0·5, 0·4, 0·5, 0·55, 0·75; A, 0·1, 0·25, 0·3, 0·4, 0·4, 0·5, 0·5, 0·55, 0·6, 0·7, 0·75, 0·75, 0·8; reaction to 99·8° F. Change to P.B.E. Dil. C, 0·1, 0·15, 0·25, 0·35, 0·5, 0·75; B, 0·1, 0·15, 0·2, 0·3, 0·35, 0·35; P.B.E., *0·35 c.c.* (here the error occurred). Dil. B, 0·35, 0·5, 0·75; A, 0·1, 0·15; reaction to 99·2° F. once. This second course is now closed.

(*b*) Young man aged 27, shop assistant. Cavity in right apex, with consolidation of upper lobe of right lung and hæmoptysis. Had been in sanatorium for three months. The commencing dose was Dil. D, 0·00001 c.c. of P.B.E.; D, 0·1, 0·2, 0·4, 0·7; C, 0·1, 0·2, 0·35, 0·5, 0·75; B, 0·1, 0·2, 0·3, 0·45, 0·7; A, 0·1, slight hæmoptysis, rest from business for two weeks; one weekly injection omitted, then followed by A, 0·15, 0·15, 0·25, 0·2. He is working daily at his business and has had no higher temperature than 98·6° F. since the first injection. Pulmonary symptoms quiescent and disease gradually drying up.

Tests for Tuberculosis.

Von Pirquet's test (cutaneous) is the most readily applied, the most satisfactory in its results, and the one generally used. This test is carried out as follows. The points of the scarifier having been sterilised by heating red-hot in the flame of the spirit lamp, a few scratches are made, as a control, upon the outer extensor surface of the arm or forearm, which has previously been carefully cleansed, and at a spot a few inches above, a drop of T. (Old Tuberculin) is, with the syringe, dropped upon the skin. The scarifier makes a few cross scratches under the tuberculin until a faint redness is perceptible. Tuberculin can be used pure or diluted, the rule being that the lower the strength used, to cause a reaction, the more active the disease. In 36 or 48 hours afterwards a note is taken of the temperature and of the condition of the punctured spots. If the result be positive the temperature may rise and the tuberculin spot become red and inflamed, with perhaps even a vesicular areola.

Contra-indications to the Use of Tuberculin.

Although experts, with their knowledge and wide experience, may be able to use tuberculin in most cases of tuberculosis with benefit and without injury, there are cases in which the general practitioner would do well to avoid the use of this remedy. In mixed infections, catarrhal or bronchial, or complicated by disease of the heart or kidneys; in rapidly advancing or extensive disease; in cases of high fever and quick pulse; in anæmia associated with little power of resistance; in those in whom there is a strong hæmorrhagic tendency; and in cases of infantile tuberculosis, tuberculin as a rule does no good.

Although I have confined my remarks almost exclusively to tuberculin administration in treatment, it must never be lost sight of that unless a patient understands the advantage of life in the open air with abundance of light and sunshine, rest, healthy surroundings, the avoidance of excitement, and the value of good and nourishing food, with cod-liver oil and other food tonics, tuberculin alone can do very little. It is only in conjunction with a rational general treatment that the striking results of the special treatment are manifest. It is here that residence in a sanatorium does so much: it teaches the tuberculous patient how to live.

"Festina lente" is the golden rule in tuberculin administration, as experiments have shown that even such a minute dose as 1/1,000,000 c.c. of tuberculin can raise the opsonic index from 0·70 to 1·3, although not the slightest clinical symptoms of change were present.

A word, in conclusion, as to the cost of the apparatus required. A good tuberculin syringe with two steel needles can be obtained for 9*s.* 6*d.* Tuberculin in its different preparations varies in price from 1*s.* to 3*s.* a bottle, containing 1 c.c. The scarifier costs only a few shillings, and the adjuncts are easily obtained at any chemist's. Altogether a very simple outlay.

Alexandra Rose Day was observed at Portsmouth on June 24th, when £928—a record sum—were collected on behalf of the Royal Hospital and the Eye and Ear Hospital.

CLERICAL, MEDICAL, AND GENERAL LIFE ASSURANCE SOCIETY.—The war has certainly had no deteriorating effect on the business of this well-known society. The new net life business for the financial year ended June 30th was £737,472, being an increase of £64,740 over that of last year, with new premiums of £25,792, showing an increase of £1953. The amount of the claims was £300,341, being a decrease of £48,710 as compared with the previous year. Included in this amount is £54,148 paid for war claims.

Reviews and Notices of Books.

Burdett's Hospitals and Charities, 1916.

By Sir HENRY BURDETT, K.C.B., K.C.V.O. London: The Scientific Press, Limited. Price 10*s.* 6*d.* net.

THIS is an authoritative guide to British, American, and Colonial hospitals and asylums, medical schools and colleges, nursing and convalescent institutions, consumption sanatoria, and other institutions of a similar character, giving a review of their position and requirements, management, revenue, and cost of maintenance, and there is no reference book more convenient and useful than "Burdett's Hospitals and Charities." The present edition is on the lines of its predecessors, among the additional matter being a list of London institutions affording facilities for post-graduate work and a list of territorial hospitals. The great hospital funds of London, the institutions for the care of the blind, deaf, and dumb, orphanages, missions, nursing and convalescent institutions are all described, while there are chapters on hospital finance and hospital charity generally. The magnitude of the interests touched upon can be realised by the statement that in the year 1914 the 1978 charities of which particulars are forthcoming had an income from all sources of £12,907,000, or a decrease of £651,000 from the income for 1913. The expenditure in 1914 was £12,144,000 as compared with £12,280,753 in 1913. The expenditure on the management of hospitals will, of course, be enormously increased as a consequence of the war, while accommodation for the wounded has multiplied throughout the country, representing 100,000 additional beds. Sir Henry Burdett pays a well-deserved tribute to the way in which the voluntary hospitals have responded to the demands made upon them in spite of the heavy financial drain on institutional resources. It is interesting to note that the Norfolk and Norwich Hospital has obtained a new source of revenue by an appeal in the form of 200 written letters, costing one sovereign, for contributions of £5 per month for each of the soldiers' beds. The response produced £5721. The beds are maintained by individuals and groups of persons of all classes, domestic servants contributing no less than £152. It is hoped that this system will produce a steady revenue after the war.

In his preface Sir Henry Burdett refers to the fact that 50 years of continuous work for the voluntary hospitals of this country will be completed should he live until August, 1918, by which time he will have passed the allotted span of threescore years and ten. For several years in succession he has appealed for someone to take up and continue his task as editor, and it is to be regretted that there has been no response to the appeal. We hope that Sir Henry Burdett will be spared to edit for a long time yet a book of the utmost value to everyone interested in hospital charities, but it would be a great loss to the hospital world if from any cause the book which has been regularly issued for 27 years should fail to make its appearance.

Nouveau Traité de Chirurgie.

Publié sous la direction de A. LE DENTU et PIERRE DELBET. *Fractures. Vol. I: Fractures en Général; Fractures du Membre supérieur.* Par JEAN TANTON, Médecin-major de l'Armée, Professeur agrégé du Val-de-Grâce. Avec 470 figures dans le texte. Paris: J. B. Baillière et Fils. 1915. Pp. 860. Price 20 francs.

THIS fasciculus of an important treatise on surgery has appeared in spite of the war, and it is of special value when innumerable fractures present themselves to all those surgeons who are concerned with the treatment of the wounded. A glance at the volume is sufficient to show the thorough way in which the subject of fractures has been treated. Fractures of the skull, of the vertebral column, and of the thorax have been excluded, as they have been treated in other fasciculi of this system of surgery, while the author has been unable to include in this volume more than the general subject of fracture and the fractures of the upper limb. The fractures of the lower limb and of the pelvis will form the subject of another volume. The recent great increase in our knowledge of fractures has been undoubtedly due to the introduction of the X rays, for thus we have been enabled to gain exact knowledge of the pathology of the living; and the author has appreciated to the full the value of skiagrams, for he has included in his work a large number. He is, however, fully alive to the erroneous deductions which the untrained may draw from X ray photographs, and he shows us illustrations exemplifying this fact.

It is needless to criticise in detail such a work as this when we are able to draw attention to the completeness and exactitude with which the author has dealt with the whole subject. We cannot give a better example of his thoroughness than his treatment of fracture of the base of the first metacarpal bone, for he recognises three, or rather four, forms of this fracture, and each of these varieties is illustrated with photographs. The sections dealing with the treatment of the various fractures are good; the illustrations are abundant and apposite.

We have not met a more scholarly treatise on fractures, and we look forward with interest to the appearance of the next volume.

The Origin and Nature of the Emotions: Miscellaneous Papers.

By GEORGE W. CRILE, M.D., Professor of Surgery, School of Medicine, Western Reserve University, Cleveland. Edited by AMY F. ROWLAND, B.S. London and Philadelphia: W. B. Saunders Company. 1915. Pp. 240. Price 13*s.* net.

Dr. Crile's work on shock, anoci-association, and kindred topics is already well known in this country. The present volume contains various papers that bear more or less on his previous contributions; they serve also as a preface to certain monographs which we are told are in preparation. It is not practicable to give an analysis of all the eight essays comprising this volume; they deal with such diverse subjects as the relation between the physical state of the brain-cells and brain functions, alkalescence, acidity and anæsthesia, pain, laughter and crying, a mechanistic view of psychology, a mechanistic theory of disease—to name but some of them. We may refer more particularly to those which have a bearing on the title of the book.

Briefly, it may be stated that the author has determined by laboratory researches that such emotions as fear and anger produce the same histological changes in the brain as physical trauma. Inasmuch as the phylogenetic origin of fear is injury, it follows that injury and fear cause the same phenomena. In their quality and in their expression, psychic shock and physical shock are the same. Dr. Crile has made a patient investigation of the cells of the cortex in human cases of exhausting diseases, in various animals completely exhausted by running and fighting, by rage and fear, by physical injury, and by the injection of strychnine, and in every instance he has been able to demonstrate that the loss of vitality—in other words, the loss of the normal power to convert potential into kinetic energy—is accompanied by physical changes in the brain cells. He concludes that these changes are "work" changes. But, further, changes were also found in the adrenals and in the liver, again in every instance. Dr. Crile regards these three organs as constituting what he calls the "kinetic system." Linked to it is the thyroid gland. "When the kinetic system is driven at an overwhelming rate of speed, as by severe physical injury, by intense emotional excitation, by perforation of the intestines, ... by the sudden onset of an infectious disease, by an overdose of strychnine, by a Marathon race, by a grilling fight, ... by anaphylaxis, the result of these acute overwhelming activations of the kinetic system is clinically designated shock, and according to the cause is called traumatic shock, toxic shock, anaphylactic shock, drug shock, &c." In this way the author endeavours to harmonise the pathological changes in these organs in disease with the occurrence of the same changes as the result of emotional strain. Conversely, any agency that can sufficiently inspire faith or dispel worry will inhibit the action of emotion on these organs. They can be, and are, physically damaged by fear—they can be protected and strengthened in their function by suitable psychical stimuli.

We commend to the thoughtful reader these essays on the fascinating subject of psychical and physical interaction.

JOURNALS.

Quarterly Journal of Experimental Physiology. Editors: E. A. SCHÄFER, W. D. HALLIBURTON, C. S SHERRINGTON, E. H. STARLING, and A. D. WALLER. Vol. IX., No. 4. London: Charles Griffin and Co., Limited. 1916. Pp. 281–401. Price 7*s.* 6*d.*—On the Regeneration of the Cervical Sympathetic After Section, by R. Tsukaguchi. The experiments were made on two dogs and a number of adult cats. In the dogs, about six months after cutting out a portion of the vagus and sympathetic trunks the paralytic symptoms affecting the eye and other parts are not entirely recovered from. There is no restoration of the inhibitory action of the vagus on the heart nor of its motor effects upon the œsophagus and stomach. The histological observations indicate that the regeneration of the sympathetic has been accomplished not by its own fibres alone, but to a large extent by others of vagus origin. In cats, the regenerating fibres of the cut sympathetic first reach the superior cervical ganglion between three and four weeks after section and begin to function about six weeks after section.—Notes on the Functional Regeneration of the Cut Cervical Sympathetic and Vagus. By E. A. Schäfer and H. O. Feiss.—Even 10 to 12 months after excision of a portion of the cervical vagus and sympathetic, there are still differences observable in the physiological conditions of the parts supplied by the sympathetic as compared with the normal side. Stimulation of the peripheral (upper) end of the cut and regenerated sympathetic evokes the usual effects after such periods, but a stronger stimulus is required than the normal side. A decidedly stronger stimulation of the lower stump is required to elicit the effects of sympathetic excitation in the eye, results which are easily elicited by stimulation of the upper stump. This appears to indicate that vagal fibres have been largely instrumental in effecting the regeneration of the peripheral sympathetic. No sign of physiological recovery of the peripheral cut vagus, one dog, five cats, could be obtained after intervals of from 10 to 13 months.—The Influence of Muscle Extract on Muscle Contraction, by S. Takayasu. Saline extract of muscle affects the contraction of the frog sartorius in much the same way as a saline extract which contains excess of potassium. The deleterious effects produced by muscle extract in the contraction are due to potassium. These effects can be antagonised by a small addition of calcium chloride to the extract.—The Influence of Adrenalin on the Contraction of Skeletal Muscle, by S. Takayasu. Solutions of adrenalin 1 in 1,000,000 show no distinct effect on the frog sartorius. Immersion in solutions 1 in 500,000 or 1 in 5000 diminishes the contractile power, the effect being most marked on the height and duration of the curve, while the latency is little affected. Muscle poisoned by immersion in solutions of adrenalin rapidly recovers on being transferred to normal Ringer. Adrenalin muscular contractions are not fatigue contractions, and are unlike those produced under the influence of veratrine, although they resemble to some extent those obtained under the influence of excess of potassium salts.—Experimental Researches on Sensory Localisations in the Cerebral Cortex, by J. G. Dusser de Barenne. Extirpation and not electrical stimulation methods have been the more prolific in advancing our knowledge of sensory cortical localisation. The author claims that his method of the local application of strychnine to the exposed uninjured cortex is a great advance on the extirpation method. Strychnine produces symptoms of excitation in the sensory sphere. Some of the author's results in his experiments on cats are as follows. Application of strychnine to a local "active zone" of the cortex causes constant and typical symptoms of excitation, but if applied outside this zone there is no like disturbance. The sensory disturbance produced affects both cutaneous and deep sensibility, the disturbances in the latter manifesting themselves in an abnormal hyperæsthesia to pinching and pressure of the bones, tendons, and muscles. As to the sensory functions of the skin, both sides of the body are represented in the cortex of one hemisphere, but on the opposite side most. The author gives a minute analysis of the localisation of the sensory areas for head and limbs. The lobus frontalis has no sensory functions in the cat. The paper is illustrated by a large number of figures of the brain and one plate.—The Effects of Thyroidectomy and Thyroid Feeding upon the Adrenalin Content of the Suprarenals, by P. T. Herring. Complete thyroidectomy has little, if any, permanent effect upon the adrenalin content of the suprarenals of the rabbit—an animal in which no characteristic symptoms follow removal of the thyroid. In cats the adrenalin content of the suprarenals is diminished in direct proportion to the severity of the symptoms induced by removal of the thyroids.

The Military Surgeon.—The last issue has a special value just now, for the reports from the various Red Cross parties sent out by the unstinted generosity of the United States give comparable information about the medical and surgical work being done by each of the belligerents. In the June number Major H. H. Snively tells of the work done by the unit at Kieff, behind the Galician lines, from December, 1914, to September, 1915. The Russian Army Medical Corps, he says, takes complete charge of the wounded as far as the railhead, the Red Cross is then allowed to share in providing hospital trains, in supplying nurses for war hospitals, and is indeed allowed to equip and staff base hospitals, but under military supervision, which never loses sight of any wounded man even if he be convalescing in his distant village. Kieff had some 30,000 beds for wounded soldiers, but it received daily from 2000 to 12,000 cases, so all patients fit to travel were sent daily further on into Russia, by order, and at any rate 8 per cent. of total cases. The hospital was located in a polytechnic school and could take 750 cases, in canvas cots at first, but later iron bedsteads were supplied. The experiences of the hospital as regards infected wounds, lice, and so on, were similar to those reported from elsewhere. Cases of Asiatic cholera and typhoid fever were seen in the great military hospitals, but the civil population was unusually free from epidemics in the summer of 1915, the peasants ignorantly and ungratefully ascribing this to the absence of the doctors now away with the troops. There was no vodka, of course: a drunken man was an unusual event. To the interdiction of vodka is ascribed the lower frequency of insanity in this than in the Russo-Japanese War. Also, there was practically no venereal disease among the Russian soldiers.

The Journal of Bacteriology. Being the Official Organ of the Society of American Bacteriologists. Bi-monthly. Baltimore: The Williams and Wilkins Company; London: The Cambridge University Press. Subscription 23*s.* per annum.—It is somewhat remarkable that there is, as the publishers' announcement points out, no journal in the English language which deals with bacteriological science as a whole. This gap it is the aim of this new addition to our lists of scientific publications to fill. It is to be the official organ of the Society of American Bacteriologists, and is to serve also as a medium for the discussion of such general questions—of interest to all bacteriologists, whether engaged in medical, technical, agricultural, or purely scientific research—as the structure and physiology of the microbes, the inter-relationships of microbic types, the effects of physical and chemical agents on microbic life, the mutual interactions of microbes growing together in various media, the nutritional needs and products of metabolic activity of various microbes, new advances in technique, and so on. There is no doubt that such a journal is sorely needed. Bacteriologists dealing with any particular section are only too apt to regard that as the only important branch of the science, and it might often be greatly to their advantage to know what was going on in other fields of work. As Dr. W. T. Sedgwick says in his foreword, "Bacteriology must henceforward be recognised as a broad and fundamental branch of science, coördinate with, rather than subservient to, the other grand divisions of biology, such as medicine, agriculture, zoology and botany." The first number gives excellent promise. The contents include a paper by Messrs. Rettger, Berman, and Sturgess on the utilisation of proteid and non-proteid nitrogen, which goes to show that bacteria are unable to attack and bring about the destruction of proteins without the aid of enzymes or other proteolytic agents; and this appears to be true in the case of albumoses and peptones as well as for more complex proteins like egg-albumen. James Sherman commences an elaborate study of the protozoa in the soil and their relation to the bacterial flora, a question of great importance in agriculture. C. G. A. Roos gives a complex potato-blood-agar which will keep the meningococcus living and viable for many days and even as long as four weeks at room temperature. M. M. Obst finds that lactose bouillon is a much more suitable culture medium for B. coli than lactose-peptone-ox-bile, permitting the development of twice as many colonies from water. Some excellent abstracts conclude the first number of a useful and promising journal.

THE LANCET.

LONDON: SATURDAY, JULY 8, 1916.

The State Promotion of Scientific Research.

AT the recent Paris Economic Conference a resolution was passed urging the granting of State assistance to scientific research, while the question whether the State can usefully encourage research by granting sums of money for the purpose is naturally receiving considerable attention just now in this country, which has always been in the very front rank in producing discoverers. What we have lacked is not so much the spirit of inquiry as the faculty of applying the results of our inquiries to practical purposes. We have been too academic in this matter rather than too lazy, for, as a rule, the British man of science shows irritation when asked as to the utility of this or that discovery. But it is now recognised that our immediate requirement is to swell the ranks of investigators by affording financial help, to defray the expenses of the work, to give an adequate salary to the investigator, and, as a further stimulus, to offer a substantial reward for the work of research when that work has materialised into valuable practical application. The State must recognise, though few private individuals do, that negative results are often of the greatest importance and value. Failures, of course, must mean a large expenditure of material, but after all, when they are the sequel to honest and intelligent work, they necessarily narrow the issues of the inquiry and advance the purpose in view. This is a truism which regularly fails to appeal to the British manufacturer who hesitates to spend more money when, to his thinking, most of it is going, as he would say, "down the sink." He is in too great a hurry to see the fruits of research realised. It is the opposite spirit which has gained for Germany her high position in technical science. In an excellent series of articles upon the German economic position now appearing in the *Field*, the expert economist who writes as "Viator" attributes much of German commercial success to her large class of young men equipped to pursue research in subordinate positions and at low wages, and gives instances of organised search for discovery, both in physics and chemistry, which have been crowned with success. The Germans will spend years over an exploration, when the procedures are attended by failure after failure, with the conviction of gaining an ultimate triumph; it will be true patriotism in us if we follow their lead here.

But costly attacks upon many provinces of scientific learning cannot be maintained without financial support, and this can hardly be expected invariably from private sources. State aid, properly and scientifically organised, should provide the necessary funds where the proposed research is worth State interference. If results of State importance are to be realised this position is becoming inevitable in many technical branches of science. The grants from educational institutions, scientific societies, and corporations which have formed in the past the chief sources of support for research in this country, are totally inadequate for the prosecution of investigations the results of which are intended to create new industries. The Advisory Council for Research appointed by the Board of Education may do some good in bringing scientific work more intimately to the knowledge of a Government department, but more can hardly be hoped in this direction. Hitherto the sums of money granted by generous bodies and by occasional individual donors have nearly always been expended on research of an academic nature. The investigation of underlying principles is of vital importance, but the work should not stop at theoretical considerations. The possible significance of all the phenomena in industrial processes should early be studied and placed at the disposal of the manufacturer, and under conditions controlled by the State, where the State has found the money which made the research possible. The actual working details of a scheme of State-aided research will need to be carefully drawn up, and precautions taken to safeguard the interests of the true and first discoverer. The Association of British Chemical Manufacturers has appointed a strong provisional committee to take steps to promote coöperation between British chemical manufacturers, who would then be in a position to place before Government information upon the chemical industry, so that industrial research may be promoted and technical organisation developed. This seems to us to be a most practical way of meeting the situation, for under such a plan there is no vague wail to the State for help, but the directions in which assistance should be given by the State are indicated by those who know.

In this connexion the scheme for the promotion of scientific research presented to the public by Mr. WALTER B. PRIEST in 1905 should re-claim attention, particularly as he has now brought his ideas into line with present considerations. We commented favourably upon this scheme on its appearance, and if its underlying principles had then gained general, and especially official, acceptance it is probable that much time would have been saved, to this country and to the whole Allied cause—time which has been spent in mere preparation—while the present inconvenience of a shortage of material in so many directions would have been obviated to a large extent. The war has opened our half-closed eyes to the neglect and even discouragement displayed by the State towards scientific research. Mr. PRIEST'S scheme provides for the ample compensation to the discoverer, just as the Patents Acts offer a pecuniary prize to the inventor. It may, in fact, be regarded as an extension of these Acts, the clauses of which give an incentive not only to carrying out of research of industrial significance but to the prosecution of academic research

also. As Mr. PRIEST points out, there are discoveries which have no marketable value and for the production of which, therefore, patent rights provide no incentives, and yet these discoveries may reveal knowledge of incalculable value. Such are the discoveries, for example, which promote the public health, and it is a question whether the incentive of a substantial reward would not attract a much larger number of workers into the field of research and lead to a bigger harvest of results. That, at all events, is what has happened in Germany, and the man who will not learn from the enemy is a pedant, not a patriot.

The Practices of Absentee Medical Officers.

THE fate of the practices of members of the medical profession who have accepted, or are accepting, commissions in the Royal Army Medical Corps has not received the amount of practical attention which the importance of the subject demands. The fact that the practices of the absent medical men must in many cases suffer severely by the call which the needs of the country are making has often been insisted upon, but nothing definite has been done as yet to remedy what may become a widespread trouble and lead to frequent and infinite hardship. It must, however, be clearly stated that the neglect, which on the face of it appears to have been grave, cannot be attributed as an actual blame to anyone. It is true that no local committees have been formed with the exact intention of watching over the interests of the absentee practitioners, but the British Medical Association has made definite and strongly-worded pronouncements on the necessity of those who remain safeguarding the property and professional and pecuniary look-out of those who depart. It is the individual practitioners themselves who have with extraordinary light heartedness disregarded the situation. They have accepted commissions and in a large number of instances have gone from their homes without making, and without attempting to make, any provision for the abandoned patients. This is tantamount to saying that, while no machinery has been erected for protecting the interests of the temporary officers of the Royal Army Medical Corps, there has been no general demand for such machinery from the direction where it might have been anticipated. The Central Medical War Committee has now the whole matter under consideration, and the interference of this statutory body in a very difficult and important matter should be welcomed.

A scheme has been laid before the Central Medical War Committee under which local committees can be instituted, to whom there may be submitted the agreement which it is suggested should be entered into by an absentee medical practitioner with his deputy. The local committee is to be comprised of the practitioners of the district (if thought advisable the Local Medical War Committee can itself discharge the functions), and there would be relegated to it by the proposed agreement powers to deal with all disputes of whatsoever nature arising between the absentee and the deputy in regard to any question affecting the absentee's practice, or the carrying on of the same by the deputy, the decision of the local committee being binding on both parties. Any medical man deciding to take a commission, or being called up for ordinary military service, could thus give notice to the local committee, stating whether he has made arrangements with a medical practitioner or practitioners to carry on his practice in his absence, and if so giving the necessary names and addresses. To the various parties to such arrangements an agreement would then be submitted as forming a basis upon which the practice of the absentee could be carried on and restored to him upon return with, it is hoped, some approach to integrity. Under the proposed agreement the practitioner, on departing, definitely appoints his deputy or deputies, contracts for the faithful and diligent discharge of the requirements of the practice, and provides payment for the substituted service on a scale of remuneration judged by the gross receipts of the practice, and capable of readjustment every six months. The deputy undertakes to keep strict accounts and accurate entries of all moneys received, and to be responsible for the working costs incidental to the practice, which as far as possible should be carried on at the chief surgery of the practice; he also admits liability for all acts of negligence brought home to him. The scope and intentions of the scheme and the draft legal agreement are in accordance with the above summary; the Central Medical War Committee has the details under consideration.

It is quite clear that no scheme can exactly fit all kinds of practices. It may indeed be said that every medical man's practice is to some extent an individual affair requiring individual treatment if its preservation and cultivation are to be of the best. On the other hand, all medical practices have certain things in common, for with regard to them all there is a common need that when the principal is away some one should do his work for him, and prevent the practice from disappearing. Assuredly one difficulty about any scheme must be that the public cannot be ordered to accept the services of Dr. A because Dr. B is absent; a certain proportion of a medical man's *clientèle* will transfer themselves willingly to a nominated successor, but others will always prefer to choose a different practitioner. Each man who deputises under the suggested agreement for an absent colleague may find that he has also to look after a certain number of patients belonging to other doctors not parties to the agreement, and complications may arise here requiring some exhibition of judgment and skill if they are to be met with any uniform pattern of remedy. Undoubtedly other objections, more or less valid, will be forthcoming when the whole scheme is in the hands of those concerned, but we cannot think that any criticisms will conceal the value of instituting a general plan for dealing with the situation: the urgency of some action is admitted, and some action should be taken. The scheme, which is now under the consideration of

the Central Medical War Committee, has been drawn up with particular regard to urban practices. In country districts, for instance, the old question of mileage will occur and ask for separate treatment; but otherwise in country districts the arrangements for a deputy must naturally be far simpler than they ever can be in town communities, for in the country the public is limited by geography in its choice of a doctor. A method of payment in proportion to receipts, a certain maximum and minimum weekly sum being laid down, is clearly a fair proposal, but some ingenuity will be required to meet the case where the deputy seeks cash payment and the patients are always used to being given credit. But assuredly such matters can be dealt with by competent local committees.

Annotations.

"Ne quid nimis."

THE SIGNIFICANCE OF THE AMINO-ACIDS.

THE interesting group of bodies known as the amino-acids is disclosing facts of the utmost importance in connexion with nutrition. It is well known that on hydrolysis proteins break down by resolution of the polypeptide linkings in the molecule into an assembly of α-amino-acids, of which some 18 have been separated. Enquiry is now being developed in directions which show that each of these substances possesses its own significance—sometimes greater, sometimes less—in the processes of nutrition. Inasmuch as the proteins do not all alike resolve into the same amino-acids, it is clear that their metabolic value will depend upon the kind of amino-acid produced. In an interesting and lucid lecture upon the subject delivered before the Chemical Society on May 18th by Dr. F. Gowland Hopkins, and now published in the June number of the society's journal, these "newer standpoints in the study of nutrition"—the title of the lecture—are carefully discussed. The starting point of this study is that when a mixture of all the free amino-acids obtainable from protein has entirely replaced the normal intact protein of their food, an adult animal maintains itself and a young animal grows. In his own experience Dr. Hopkins records that scores of young animals grow steadily during experimental periods when no trace of intact protein, and no other source of flesh-forming material save amino-acids, was passing their mouths. In a brief and excellent outline[1] of the salient features of the problem Dr. Frank P. Underhill, professor of pathological chemistry, Yale University, makes similar observations. His conclusion is that the amino-acids must be regarded as foodstuffs capable of supplying the nitrogenous needs of the organism, and that the chief factors to be taken into account with regard to the nutritive value of any protein or proteins are the character and the extent of the amino-acids contained therein. Since it is mainly, if not entirely, in the form of free amino-acids, and not in complex associations of these, that our nitrogenous food begins its proper metabolism, it is obviously valuable to be able to measure the relative nutritive importance of the different molecular groups in the protein molecule. We could then determine, as Dr. Hopkins points out, whether in any particular case the withdrawal of individual amino-acids deprives the animal of something essential, or whether, perhaps, the removal from the food of any particular amino-acid under study may have little effect, because the animal can synthesise it for itself or dispense with it altogether. We may thus gain a further insight into the question of deficiency diseases. It should be pointed out, however, that during the use of the synthetic diets suggested as a basis of inquiry, Dr. Hopkins has found that it is always essential to supply the "at present mysterious vitamine or food hormone factor." The results of the experiments are very remarkable. Thus when an animal is fed on food containing only tryptophan, histidine, tyrosine, lysine, and cystine, that is, five out of the 18 amino-acids of protein, there is a remarkably slow loss of weight, and long maintenance of apparent health. On the other hand, when the five amino-acids mentioned are replaced by another five of simpler aliphatic type, when leucine, valine, alanine, and glycine, together with glutamic acid form the sole nitrogen supply, loss of weight is rapid and the animal soon succumbs. A familiar case of a non-nutritional protein is gelatin, and, significantly enough, this substance on hydrolysis yields neither tyrosine nor tryptophan. The entire absence of tryptophan from its molecule stamps it at once, says Dr. Hopkins, as a deficient foodstuff. Dr. Hopkins goes even so far as to say that he feels it quite possible that further experiment will show that life can be maintained on a mixture from which many of the amino-acids are lacking. This suggests that if nutrition can be guaranteed on a quite limited number of amino-acids, the solution of the problem of artificially synthesising our food-supply is brought within the region of possibility. On all fours with this are the independent conclusions of Professor Underhill in the work already referred to. Investigations of this character promise ultimately, he suggests, to lead to the assignment of more or less specific functions to the various amino-acids, and hence will indirectly indicate the relative efficiency of this or that protein in bringing about a desired result in nutrition. The whole story is a triumph of biochemical research.

[1] The Physiology of the Amino-acids. By Frank P. Underhill, Ph.D., Professor of Pathological Chemistry, Yale University. London: Oxford University Press. 1915. Pp. 169. Price 6s. net.

THE TRYPANOSOMES OF SLEEPING SICKNESS.

THE South African Institute for Medical Research has recently issued a pamphlet[1] prepared by Mr. G. D. Maynard, statistician and clinician to the Institute, on the Trypanosomes of Sleeping Sickness, being a study of the grounds for the alleged identity of T. brucei with those causing disease in man in Nyasaland. The Sleeping Sickness Commission of the Royal Society in their sixteenth report seem to have satisfied themselves that the form of the malady met with in Nyasaland and Rhodesia was caused by a trypanosome believed to be common to all "fly country," and that it was spread from wild animals to man. It was therefore recommended that efforts should be made to diminish as far as possible the number of wild animals in fly areas, and it was urged that every

[1] Memoirs of the South African Institute for Medical Research, No. VI. The Trypanosomes of Sleeping Sickness, being a Study of the Grounds for the Alleged Identity of T. Brucei with those Causing Disease in Man in Nyasaland. By G. D. Maynard, F.R.C.S. Edin., Statistician and Clinician. Published by the Institute, Johannesburg, December, 1915. Pp. 39, with 26 charts. Price 5s.

wild animal destroyed or driven out would be one less source or centre of infection. The Commission at the same time admitted that there were many difficulties in the way of carrying out this recommendation. Mr. Maynard, while agreeing that the conclusions of the Commission should not be treated lightly, recommends caution in entertaining them. He takes exception to the suggestion that sleeping sickness exists unrecognised in the Union of South Africa. He observes that the assumption that the disease occurs in hitherto unsuspected areas is apparently based entirely upon the presumed identity of the Trypanosoma brucei with the organism causing human trypanosomiasis in Nyasaland. Mr. Maynard tests some of the evidence brought forward by the mathematical methods of Professor Karl Pearson, especially with regard to the morphology of the organisms. He is of opinion that the analysis of length distributions shows that the dimorphic trypanosomes dealt with—namely, T. rhodesiense, T. brucei, T. gambiense, trypanosomes of Nyasaland sleeping sickness, and Nyasaland wild game strain, have certain features in common. There is some evidence to suggest that there is less similarity between the Nyasaland human strain and T. brucei than between T. rhodesiense, of Stephens and Fantham, and T. gambiense as recorded by these authors. The analysis suggests to him that uniformity in treatment of strains, prior to the inoculation of rats, from which measurements are made, may be an important factor in determining the mean size and the variability of the components of the distributions. No valid argument in regard to the identity or otherwise of T. brucei and the trypanosome causing disease in man in Nyasaland, can, he thinks, be drawn at present from length-measurement distributions. At the present time, Mr. Maynard says, the only valid arguments in favour of the identity of the trypanosome causing disease in Nyasaland with T. brucei is to be drawn from experiments in regard to their pathogenicity for animals, and these, as well as such serological experiments as have been undertaken, negative, in his opinion, the supposition of identity or even of close relationship. There is, he holds, no evidence at present from the known geographical distribution of T. brucei to suggest that it is a cause of sleeping sickness in man, adding that even if it were found to produce disease in man this would of itself constitute no greater argument in favour of its identity with the Nyasaland human trypanosome than with T. gambiense. Mr. Maynard expresses the opinion that from the foregoing it would appear that there is very little scientific evidence to support the contention that T. brucei and the trypanosome causing sleeping sickness in Nyasaland are the same species, while there are some very valid reasons for regarding them as distinct. Although the question may still be considered *sub judice* there does not seem to be any justification for entertaining a bias in favour of their identity; if this be admitted, it follows that the recommendations of the Commission, which are based on their assumed identity, do not rest on a sure foundation of fact. Mr. Maynard suggests certain alternative hypotheses as possible explanations of some of the facts. Finally, he points out that unless an unmodified game strain be the cause of human trypanosomiasis—and the weight of evidence appears to him to be against this view—the human carrier is of much greater importance than the wild animal, and consequently the recommendations of the Commission cannot, unless considerably modified, be accepted as a satisfactory solution. The wholesale destruction of the big game of Africa cannot be accomplished without profoundly affecting the economic position of the continent, nor, even if it could be satisfactorily carried out, can any positive guarantee be given that the situation in regard to sleeping sickness would be improved.

THE RELATIVE PROPORTION OF BOYS AND GIRLS BORN DURING THE WAR.

THERE is a widespread belief that the proportion of male births tends to rise under the conditions produced by warfare, and that this excess of boys has in the past been a useful factor in restoring the male population of a country whose manhood had been depleted by a long campaign. It has been contended that, since famine and hardship are conditions of its production, this excess of boys does not occur in the case of the larger nations of the present world-warfare, as these conditions are not present, at all events not yet. The phenomenon should be noticeable, if statistics were available, in occupied Belgium and Serbia, not in England or France. We have, however, seen a recent published statement to the effect that in France this year the number of males at birth greatly exceeds the number of females, and that in a Paris maternity hospital an overwhelming proportion of boys is being born. We do not know the authority for such statements, but the figures in our possession do not confirm them. At the Maternité Départementale in Châlons-sur-Marne, for which the matron in charge, Miss E. M. Pye, has furnished us the figures up to the end of May last, 122 boys and 140 girls have been born to women of the distressed area of the Marne, where, if anywhere in France, the conditions are those of want and of strain.

HEMIGLOSSITIS IN MEASLES.

SOME catarrh of the mucous membrane of the mouth occurs in measles and may lead to ulceration, but glossitis is not mentioned as a complication in the text-books. At a meeting of the Société Médicale des Hôpitaux of Paris recently M. Paul Sainton reported two cases. In the first case the patient was a young soldier with such a painful swelling of the tongue that asphyxia was feared. The swollen organ projected from the mouth, and he could neither speak nor take food. The condition rapidly subsided, but during the acute stage exploration of the tongue could not be carried out. In the second case the patient was also a young soldier who, on the third day of a slight attack of measles, suddenly complained of difficulty of mastication. Examination showed only some diffuse redness of the throat; the tongue was white, furred, and red at the edge. There was submaxillary adenitis sufficient to explain the patient's trouble. But on the following day the temperature, previously normal, rose to 100·4° F., the mouth was closed, and speech and deglutition were difficult. There were spontaneous pains in the tongue and all its movements were painful. It was put out with difficulty and the mouth was opened with pain. The tip was swollen, and its bright-red colour contrasted with the coating of fur on the middle of the tongue. Palpation, which was painful, showed on the right

side of the tip, at a distance of 1 cm. from the extremity, a non-fluctuating lump of the size of a filbert which was lost in the neighbouring indurated tissue. On the following day the trouble increased. Articulation and even the taking of fluids were difficult and there was abundant salivation. The lump did not sensibly vary in size and the surrounding area of inflammation was almost limited to the right side of the tongue. The general condition was bad and the temperature was 104°. When the formation of an abscess seemed probable the lump began to diminish and the symptoms regressed. The tongue rapidly regained its normal suppleness, but a little redness at the tip and the submaxillary adenitis persisted. On the eighth day the tumour had disappeared. The measles ran a mild course, but terminated in slight suppurative otitis. Hemiglossitis is rare. In 1879 Guéneau de Mussy reported two cases very similar to the preceding one, but in neither was any recognised infection present. The swelling was almost completely localised to the left side of the tongue, and resolution took place by the fifth day. As to the pathology of this deep glossitis, Sabrazes and Bousquet described in 1897 a case followed by a necropsy. There was an interstitial infiltration of the tongue by embryonic cells, with thrombosis of the veins. The pathogenic agent was the streptococcus. M. Sainton thinks that in his case the lump was due to inflammation of the glands of Blandin or Nuhn. The glands of this name are situated on either side of the midline at a distance from it of ½ cm. and of 1 cm. from the edge of the tongue. The centre of the lump corresponded to this position. No doubt under the influence of the buccal inflammation of measles the gland became affected through its duct.

THE IMPORTATION OF GERMAN SYNTHETIC DRUGS INTO AMERICA.

WE are indebted to an American correspondent for the circular of the New York house of the Farbwerke-Hoechst Company addressed to doctors in the United States informing them that—

> Thanks to the good efforts of the State Department, the Allied Governments have consented to unmolested passage of a quantity of salvarsan, neosalvarsan, and novocain, and that the German authorities, despite the abnormal conditions, have now permitted the exportation of these products to the United States. The first shipment of salvarsan and neosalvarsan is on the way to this port on the s.s. *Nieuw Amsterdam*, which is expected to reach here the early part of the week beginning May 22nd. The only condition imposed upon us by the German Government is that strict guarantees have to be given on the part of this company that the shipments allowed to come from Germany are for use in this country only, and under these circumstances there is nothing for us to do but to continue our method of direct distribution as practised since the outbreak of the war. Notwithstanding advanced cost to us, due to very materially increased cost of importation, we shall maintain the schedule which has been in existence since April 1st, 1915, namely, $4.50 per ampule for salvarsan 0·6 gram, and neosalvarsan 0·9 gram.

We are informed that while no general undertaking has been given in regard to the shipment of such drugs, their importation into the United States has been allowed by the Board of Trade in certain special cases. In October and November last, for example, certain quantities were shipped for the use of the United States Army and Navy in consideration of the fact that the quantities required were at that time unobtainable elsewhere. In December last a permit was granted for the shipment of what was stated to be a six months' supply of salvarsan and neosalvarsan for the whole of the United States of America on the understanding that at the end of the six months the United States of America would be self-supporting in the matter of these drugs. In January last a similar concession was made in regard to novocain, but no other permits have been granted.

THE WELSH NATIONAL SCHOOL OF MEDICINE.

IT is now nearly a year since Lord Pontypridd laid the foundation-stone of the new buildings of the Welsh National School of Medicine at Cardiff. Towards the erection of these buildings Sir William Thomas has given over £90,000 on condition that Treasury grants are sufficient for maintenance, while the efforts of Colonel E. M. Bruce Vaughan on behalf of the school have resulted in a contribution of over a quarter of a million of money. The war has unfortunately interfered with the carrying out of the project, and has occasioned a delay of the Treasury grant. The postponement is naturally a source of keen regret to its promoters, and must cause anxiety to all those who have the cause of medical education at heart and who view with dismay the probable shortage of medical men in the near future. We welcome, therefore, the publication in brochure form of the speeches delivered last August at the inaugural proceedings at Cardiff by Lord Aberdare, Lord Pontypridd, Sir Ivor Herbert, Sir William Thomas, Sir William Osler, and Professor E. H. Starling, and trust that they may command a wide publicity. The Royal Commission on University Education in Wales paid a visit last week to Cardiff and other university centres in Wales, and doubtless Sir William Osler's address at Bangor will substantially advance the cause of the Welsh National School of Medicine. He spoke of the purposes of a medical school as threefold: (1) The prevention of disease; (2) the solution of problems connected with the cure of disease; and (3) the teaching of medical science and practice. Judged from this broad standpoint the Cardiff scheme cannot be considered too lavish, as the provision of facilities for research in the interests of public health is as important as the training of medical students.

LUARGOL OR "102."

M. Danysz, who has for some time past made a study of the cure of trypanosomiasis, has recently added to the therapeutic armamentarium a new product under the designation of "102," consisting of a bromo-argento-ammoniated arseno-benzol. The microbicide properties of silver salts have been long known, whence colloid silver has come into practical use for inunction and intravenous injection. The results of Danysz's experiments with this substance are given in the issue of *Il Morgagni* for June 14th, and show that it is more active than other arsenical preparations in trypanosomiasis, and that small doses frequently repeated give better results than the injection of the same quantity of the remedy in a single dose. Luargol is an orange-coloured powder, insoluble in water, but very soluble in sodic hydrate, with which it forms a dark-brown solution. Ten centigrammes are soluble in 1 c.c., or better 1·5 c.c. of normal sodic hydrate, and this may be used for injection diluted with sterile distilled water to 1 per cent. The apparatus supplied consists of a tube containing

the dose of luargol, a flask with 20 c.c. of the diluted sodic hydrate, and a filter in a glass tube. The contents of the tube are dropped into the flask and shaken for five minutes until completely dissolved, the filter tube is then fitted on and the whole sucked up into a syringe of 20 c.c. capacity. For syphilis Danysz advises progressive doses of 15, 20, 25, and 30 centigrammes up to a total of 1·20 to 1·50 gm., with intervals of two, three, and four days between each injection. The febrile and general reaction is certainly much less than with salvarsan. Intolerance is rarely observed; even slight arsenical erythema is infrequent. Herxheimer's reaction occurs with "102," as with every other anti-syphilitic remedy, as might be expected. Thus, a roseola treated with 0·10 gramme became more copious, red, and inflamed on the following day, while the temperature rose to 39° C., with the usual phenomena of Herxheimer's reaction, shivering, headache, and sweating; on the other hand, there was no vomiting or diarrhœa, the usual phenomena of intolerance. From the point of view of disagreeable concomitants, therefore, "102" seems to offer an advantage over "606" and "914." There is, however, a possibility of the occurrence of slight venous thrombosis at the point of injection when the requisite technique is not rigorously carried out. Danysz attributes this thrombosis to insufficiency of soda in the solution, but these risks are reduced to a minimum by using the apparatus supplied commercially. Lastly, the therapeutic activity of luargol is decided, syphilitic manifestations disappearing with much greater rapidity than with "606" and "914," especially in secondary ulcerative forms in which "606" often fails. This new preparation marks a progress in the treatment of syphilis and deserves further extended trials.

THE "VOMITING SICKNESS" OF JAMAICA.

IN a report by Dr. H. Harold Scott, Government bacteriologist to Jamaica, which on account of war economy is not being printed in full but appears in abstract in the *Tropical Diseases Bulletin* (vol. vii., No. 6), an important investigation is given of a disease which for many years past has been a veritable scourge on the island. The term "vomiting sickness" has apparently been long used in Jamaica to cover any disease occurring in the cooler months and associated with vomiting and convulsions, but is now becoming restricted to an affection of which the symptoms and post-mortem changes are not those of any known disease. The case mortality is above 80 per cent., and the toll of deaths is heavy. Major T. J. Potter, R.A.M.C., came to the conclusion in 1912 that the majority of deaths ascribed to vomiting sickness were due to yellow fever, but Seidelin, who in 1913 was the first to give a detailed description of the morbid anatomy, showed that the condition was neither yellow fever nor cerebro-spinal fever. Dr. Scott's own investigation on a typical and severe outbreak in February, 1915, revealed the fact that in a majority of cases where a trustworthy history was obtainable ackees—the fruit of the tree *Blighia sapida*—had formed part of the last meal taken. Under certain conditions ackees are known to be poisonous, and in a case of such poisoning in a human subject Dr. Scott noted the same symptoms and post-mortem findings as occur in vomiting sickness. He observed also that in animals to which an aqueous extract of unopened ackees had been given similar manifestations occurred. He considers that all the characteristics of the sickness find ready explanation in the ackee theory—viz.: (1) the peculiar seasonal prevalence; (2) its confinement to Jamaica, so far as is known; (3) the sudden onset of symptoms in apparent good health, and in the well-nourished as in the emaciated; (4) the rapid and complete recovery of non-fatal cases; (5) the affection of several members in one house or close neighbours in a settlement; (6) the vastly greater preponderance in children; (7) the absence of preference as regards sex; (8) the rarity of occurrence in white children and in East Indians; and (9) the pathological changes induced. Dr. Scott's exhaustive investigation will go far towards settling the origin of Jamaican vomiting sickness, and it remains to isolate and identify the actual poisonous substance in the fruit. His paper appeared at length in the April number of the *Annals of Tropical Medicine and Parasitology*.[1]

THE ROYAL SOCIETY OF MEDICINE: SECTION OF OTOLOGY.

IT has been arranged to hold a special discussion on "Warfare Injuries and Neuroses of Otological Interest" on Friday, Feb. 16th, 1917, at 5 p.m. This early notice is given in the hope that those interested will prepare reports of cases to submit to the meeting, and will send full particulars of them not later than Nov. 30th to Mr. E. D. D. Davis, 81, Harley-street, W. The council hope that if they receive sufficient material they will be able to classify and group the cases, as this should add to the value of the discussion; and it is therefore suggested that those sending in cases should later on send a further report on the progress of the cases; these additional reports should be received before the middle of January. Pathological notes of any fatal cases will, we understand, be considered extremely valuable.

THE Harben lectures for 1916 will be delivered at the Royal Institute of Public Health, 37, Russell-square, W.C., on Thursdays, July 13th, 20th, and 27th, at 5 P.M., by Dr. A. C. Houston, F.R.S. Edin., Director of Water Examinations to the Metropolitan Water Board. The subject chosen for the lectures is "Rivers as Sources of Water-supply."

[1] THE LANCET, June 17th, 1916, p. 1222.

METROPOLITAN HOSPITAL SUNDAY FUND.—The following are among the chief amounts received at the Mansion House up to the middle of the week:—

Anon., £1000; Mr. William Herring and Anon., £500 each; Messrs. Watts, Watts, and Co., £210; Mr. Alexander Miller, £200; Brixton Independent Church, £181; The Temple Church, £122; St. Peter's, Vere-street, £118; St. John's, Penge, £110; Christ Church, Chislehurst, £106; Corporation of London, United National Collieries, and Westminster Chapel, £105 each; Sir W. Vaughan-Morgan, Lieutenant-Colonel More Nisbett, Messrs. Sloper Brothers, Sir Savile Crossley, Mr. W. D. Graham-Menzies, Messrs. George Williamson and Co., Messrs. Blyth, Green, Jourdain, and Co., Messrs. Bessler, Waechter, and Co., and Mr. E. Nortin, £100 each; St. Mark's, Reigate, £98; St. Philip's, Kensington, £86; St. Andrew's, Frognal, £85; All Souls, South Hampstead, £78; Regent Square Presbyterian Church, £74; Brompton Oratory, £68; Holy Trinity, Roehampton, £67; St. Stephen's, Ealing, £65; Crouch Hill Presbyterian Church and St. Matthew's, Bayswater, £63 each; St. Michael's Paddington, £61; Gray's Inn Chapel and St. Marylebone Presbyterian Church, £57 each; St. Anne's, Soho, £55; The Chapels Royal, £54; St Luke's, Redcliffe-square, £53; Mr. Oscar S. Ashcroft, Messrs. W. Cory and Son, Messrs. Taddy and Co., Messrs. Rylands and Son, and Messrs. Stapley and Smith, £52 10s. each; Christ Church, Brondesbury, £51; Mrs. Kenneth Clark, Mr. Otto Beit, Anon., Miss M. E. Druce, Mr. G. P. Gooch, Mr. Russell D. Walker, Miss Howell, St. Peter's, Belsize Park, Mr. Josias Alexander, and St. Michael's, Highgate, £50 each.

The total already available for distribution amounts to about £30,000.

THE USE OF AMMONIA IN THE CHLORINATION OF WATER.

BY JOSEPH RACE, F.I.C.,
CAPTAIN, CANADIAN ARMY HYDROLOGICAL CORPS.

IN the course of some experiments on the effect of colour, turbidity, and temperature on the chlorination of water, I thought it would be interesting to determine the relative efficiencies of various hypochlorites. Nothing worthy of mention was observed until ammonium hypochlorite was used. This was prepared in solution by the double decomposition of calcium hypochlorite and ammonium oxalate, and great care was exercised to prevent the addition of an excess of oxalate, which if present would introduce a factor of unknown value. It was anticipated that the reaction would proceed somewhat along the lines represented by the following equation:—

$Ca(OCl)_2$	+	$(NH_4)_2C_2O_4$	=	CaC_2O_4	+	$2NH_4OCl$
Calcium hypochlorite.		Ammonium oxalate.		Calcium oxalate.		Ammonium hypochlorite.

The calcium oxalate was deposited by centrifuging at a high speed and the supernatant liquid removed for experimental work.

In testing the effect of this solution on a culture of B. coli communior seeded into raw Ottawa River water, I was much surprised to find that the germicidal value was very much in excess of the hypochlorites of calcium, sodium, and potassium. The velocity of the reaction as calculated by the formula $K = \frac{\log \frac{N_1}{N_2}}{t_2 - t_1}$, in which N_1 represents the number of organisms at t_1 and N_2 at t_2, showed that with 0·3 part per million of available chlorine in each instance the value of K for ammonium hypochlorite was twenty to thirty times as great as that of calcium hypochlorite. This experiment was confirmed by others which gave similar results.

In searching for an explanation of the above phenomenon, it occurred to me that it was probable that ammonium hypochlorite was exceedingly unstable in dilute solution and spontaneously decomposed into chloramine and water as represented by the following equation:—

NH_4OCl	=	NH_2Cl	+	H_2O
Ammonium hypochlorite.		Chloramine.		Water.

Chloramine has been shown by Rideal[1] to have a much greater germicidal action than an equivalent of chlorine. Rideal deduced this fact from experiments on the chlorination of sewage, in which he found that "the first rapid consumption of chlorine or hypochlorite was succeeded by a slow action which continued for some hours, even days, and was attended by a germicidal power after free chlorine or hypochlorite had disappeared. ..... It became evident that chlorine, in supplement to its oxidising action, which had been exhausted, was acting by substitution for hydrogen in ammonia and organic compounds, yielding products more or less germicidal." He supported this by determining the carbolic coefficients of hypochlorite, and of hypochlorite with the addition of an equivalent of ammonia. These gave values of 2·18 and 6·36 respectively. Although Rideal seems to have made this experiment merely for the purpose of explaining an observed phenomenon, it is curious that the possibilities of its practical application to water and sewage disinfection seem to have been either entirely overlooked or discarded on account of economic considerations.

After noting the above-mentioned facts in connexion with ammonium hypochlorite, I followed up Rideal's work and produced dilute solutions of chloramine by the addition of ammonia to calcium hypochlorite solutions. These had the same germicidal power as the chloramine produced by double decomposition, and were approximately three times as efficient as an equal quantity of hypochlorite.

The next step was to determine the relative proportions of hypochlorite and ammonia that would yield the greatest efficiency. The results obtained, though not entirely conclusive as to the most efficient ratio, showed that an increase in the ammonia beyond an equivalent of the chlorine (available chlorine : ammonia as $NH_3 = 2 : 1$ by weight) did not produce results commensurate with the increase of ammonia. Half an equivalent of ammonia, or chlorine : ammonia = 4 : 1, gave inferior results, but the reduction in efficiency was very much smaller than the reduction in the ammonia. The relative proportions of chlorine and ammonia must also be considered from the economic standpoint, and when this process is carried out on a large scale these various considerations will demand a rather fine adjustment.

A remarkable feature of the treatment of water with a mixture of hypochlorite and ammonia is the almost entire absence of absorption. On adding bleach to the Ottawa River water so as to produce a mixture containing 10 parts per million of available chlorine, about 35 per cent. is absorbed in five minutes at 60° F. and 60 per cent. within one hour. If an equivalent of ammonia is first added to the bleach, only 1·4 per cent. of the available chlorine is absorbed in one hour and 3·2 per cent. in 20 hours. As there is practically no absorption of the germicidal agent, the longer the contact period the better will be the results obtained. For instantaneous sterilisation the relative efficiency ratio of 3 : 1, for the mixture of chlorine and ammonia as compared with chlorine, cannot be obtained, but with increase of contact period the efficiency ratio also increases and after about 40 minutes the ratio becomes greater—3 : 1. The germicidal action of the mixture continues to persist on account of non-absorption, and for a comparatively long time and as a consequence of this no aftergrowths are produced.

Cost.—Basing the calculations on a ratio of one equivalent of ammonia to one equivalent of available chlorine (0·5 part per million NH_3 to 1·0 part per million available chlorine)—a very conservative estimate of the most efficient ratio—this process becomes economical when the price of hypochlorite exceeds 8*s.* 4*d.* per 100 lb. This statement is based on the mixture produced being three times as efficient as hypochlorite, that 33 per cent. of available chlorine can be obtained from bleach, and that ammonia can be purchased at 1*s.* per lb. The efficiency ratios of 3 : 1 can be obtained under the conditions of chlorination usually found, and no alteration in the point of application will be required. Bleach containing more than 33 per cent. of available chlorine can be obtained, but very few plants actually extract more than this amount, as there are certain losses which are unavoidable. The present price of ammonia solution, 16° B., is quoted in the United States of America at 2¼ to 2½ cents per lb. This solution contains 10·3 per cent. of NH_3, and the anhydrous ammonia is therefore worth 22 to 25 cents, or approximately 1*s.* per lb. In Ottawa bleach can be obtained for 14*s.* 9*d.* per 100 lb., and by the adoption of the ammonia process the heavy dosage of 1 part per million of available chlorine required to treat the Ottawa River water (colour 40 parts per million platinum scale) can be reduced to 0·33 part per million, with a saving of about 28*s.* per day, or £500 per annum, if the laboratory results can be duplicated under service conditions. In the United States, where much higher prices prevail for bleach, the advantage to be gained by the substitution of the ammonia process is, of course, even greater.

Æsthetic consideration.—For some years it has been considered as at least probable that the fishy odour and taste of heavily chlorinated water was caused, not by the chlorine or hypochlorite, but by substituted nitrogenous compounds. At first sight it would appear that by the addition of the substituted nitrogenous compounds contained in the ammonia mixture this objection would be accentuated and might deprive the process of its practical value. In practice no such result is obtained and no trace of the added mixture can be detected. As the total amount of chlorine added to the water is only about one-third of the usual dosage, the total amount of chlorine compounds, nitrogenous and otherwise, is only one-third also, and complaints regarding taste and odour should be reduced and not increased by the adoption of the new process unless the compounds produced are totally different in the two cases.

Since writing the foregoing I have applied the above process to a small plant treating 200,000 imperial gallons per day and have met with unexpected difficulties. When a 10 per cent. solution of bleach was made and strong ammonia (0·880) added, a rapid loss of available chlorine resulted. This was reduced considerably by diluting the hypochlorite solution before adding the ammonia, but even then the results were not satisfactory. Laboratory experiments confirmed the loss produced by mixing comparatively

[1] Jour. Roy. San. Inst., 1910, vol. xxxi., pp. 33-45.

concentrated solutions, and also that the loss could be obviated by immediate dilution with large volumes of water. The arrangements in the experimental plant are now being altered so that the ammonia and hypochlorite will only mix for a few seconds before dilution with the raw water in the intake pipe.

Although various details have yet to be worked out, these notes are published in the hope that others will take up this work and endeavour to work out a process that will give some relief from the present exorbitant price of hypochlorite.

Ottawa Civic Laboratories.

PARIS.

(FROM OUR OWN CORRESPONDENT.)

The Influence of Syphilis on the Wounds of War.

THE influence of syphilis on the effects of traumatism has long been known, and is now being freely observed in military patients. The consolidation of fractures, in particular, is slower in syphilitic subjects, the callus though more profuse is more friable. Dr. Sourdel, a surgeon with the army, has drawn attention to several points in this connexion, mentioning that the influences of syphilis on the wounds of war manifest themselves not at first but in the later stages of treatment. A wound involving skin and muscle, for example, will be found slow in cicatrisation, the borders becoming livid and badly vascularised, but the unhealthy conditions will disappear rapidly on the application of a specific dressing like Vigo's plaster. In suppurating conditions after operations on the knee-joint, after a long period of discharge there will be rapid amelioration, but there will be fistulous tracts, and these will continue to discharge with defined edges as though punched out. If a specific history is obtained, drastic treatment like the intravenous injection of cyanide of mercury will generally give good results. Syphilitic subjects are liable to secondary hæmorrhage, and minor causes—the irritation of a ligature, a drain, or a small foreign body—produce in them serious results, even hæmorrhages to the point of anæmia. If these patients are submitted to some such specific treatment as hypodermic injection of biniodide of mercury, the tendency to hæmorrhage will disappear and cicatrisation will proceed normally. Dr. Sourdel recommends the specific treatment for syphilis of every wounded syphilitic subject, especially where any abnormality occurs in the course of the healing of the injury.

Public Health and the Cinema.

Professor Raphael Blanchard has represented to the Academy of Medicine the advantage of using the cinema to spread valuable hygienic notions among the public in a striking manner. The idea is a sound one, and already the sanitary services have organised cinematograph displays comprising many valuable scientific records. It is altogether desirable that the spectators at these shows, while being interested in the display, should learn the elementary facts concerning the diffusion of disease.

Transplantation of Cartilage in Reparative Surgery.

Dr. Morestin brought before the Academy of Medicine a subject of great practical interest at the present moment—viz., the rôle which the transplantation of cartilage may be destined to play in the vast domain of reparative surgery. Cartilaginous props have already been employed for the flaps in plastic nasal surgery. But Dr. Morestin's new method consists in a wide extension of this principle in the repair of cranium and of the bones of the face. Of all the tissues none can be grafted more easily than cartilage, which is not merely tolerated by the tissues into which it is transplanted, but lives and flourishes there. It has no tendency to be absorbed and only undergoes trifling modification. The graft is therefore a stable one and can be utilised with confidence. Cartilage commends itself also as a graft on account of the extreme ease with which it can be cut into any form by means of a simple bistoury. In practice it is always the costal cartilages which are employed, particularly the sixth to eighth, the removal of which has no unpleasant consequences. Fragments of cartilage from another subject may also be employed. With such grafts we are in possession of an easy and certain procedure for making good losses of cranial substance, even if these are large and irregular. The method is specially suitable for replacing portions of frontal bone or of the orbital margins. Even the malar arch can be thus restored, or the greater part of the maxillary bone replaced. The hope is justified that in cases where the orbit has been extensively damaged, conditions suitable for a proper prosthesis may be attained by means of cartilaginous fragments. In repairing limbs, especially the hand and foot, the procedure should have some useful application.

The Sign of the Crossed Leg in Raised Arterial Tension.

A simple clinical observation may be of service in the diagnosis of increased arterial tension. The sign consists in the measurement by the eye of the shock produced by arterial momentum in the leg which is crossed over the other, a shock due to the partial obstruction produced at the level of the popliteal vessels. The patient is asked simply to cross one leg over the other in the ordinary way. Normally the upper leg does not apparently show any spontaneous movement, or it requires careful attention to note the oscillation synchronous with the arterial pulsation. But this is not the case in observing the subject of plus tension. Dr. Molle has noted that oscillation due to the arterial shock begins to be apparent with a systolic pressure of 160 to 170 mm., and is marked with a pressure over 170 mm. The observer should carefully watch the limb from the side, and he will be surprised at the ease with which the movement can be registered. The sign may be made still more striking by covering the limb with a piece of paper such as a folded journal, when the amplitude of movement may become remarkable. The observation may be compared with one made by Delpeuch in 1900. He noted rhythmic shocks of the head when placed in certain positions, synchronous with arterial pulsation in cases of aortic lesion, especially aortic insufficiency.

July 4th.

EPSOM COLLEGE.

THE annual general meeting of the governors of Epsom College was held at the office in Soho-square on June 30th, when the Treasurer, Sir Henry Morris, occupied the chair, supported by many representative governors.

In moving the adoption of the report, Sir HENRY MORRIS referred to the loss which the council had sustained in the death of two of their members, Sir Thomas Boor Crosby and Mr. Stanley Boyd. In reference to the reduced receipts from subscriptions as a result of the war, he mentioned that one member of the council had recently procured in less than two months a sum of over 40 guineas in annual subscriptions, and he expressed the hope that other governors would endeavour to bring the work of the foundation before their friends. He expressed the appreciation of the council at the services rendered to the College by the *British Medical Journal* and THE LANCET, adding that the British Medical Association had rendered special help in collecting contributions, and that the Medical Insurance Agency had recently sent a donation of £100, which brought the total of the donations of the Agency to over £500 within a very short space of time. He expressed the regret of the council at the death of the Rev. W. A. Thomas, a master of the College for 32 years, who throughout that period had won the affections of many generations of boys as well as of his colleagues on the staff, by all of whom he was deeply respected.

The report showed that the foundation and the trustee funds render assistance to 100 pensioners, medical men, or the widows and aged daughters of medical men in reduced circumstances, and that 50 sons of medical men are being boarded, educated, and clothed at Epsom College free of charge. The report further stated that, although the numbers in the school were at first slightly affected by the war, the College is now full, the total number of boys being 305, as against 273 at the corresponding period last year. The report also included a good list of scholastic honours gained, and mentioned that over 520 Old Epsomians are serving with the forces, of whom 420 have joined since the outbreak of war, while in the roll of honour are included 21 who have been killed in action, 4 who have died in hospital, 40 wounded—two of them twice, 4 missing, and 1 a prisoner. Twenty-seven Old Epsomians have, it appears by the report, been mentioned in despatches—4 of them twice, 3 (since

killed) have been awarded the D.S.O., and 7 have received the Military Cross.

After the transaction of formal business a cordial vote of thanks to the chairman for the services which he renders to the College as treasurer was carried with acclamation.

The report of the scrutineers showed that the following had received the largest number of votes at the election and were consequently elected:—Pensioners: Isabella S. V. Wall (highest pensioner); Mary Molineux (ordinary pensioner); Katherine Lambkin (ordinary pensioner). Annuitants: Eliza G. Stevens (Morgan annuitant); Emily Wallace (Brodie Sewell annuitant). Foundation Scholars: Thomas A. Mason, John R. Simpson, William R. Pike, Alexander Shiels. Robert G. G. Evans was also admitted a Foundation Scholar, an additional vacancy having occurred since the voting-papers were issued.

THE SERVICES.

ROYAL NAVY MEDICAL SERVICE.

IN accordance with the provisions of Order in Council of April 1st, 1881, the undermentioned Fleet-Surgeons have been placed on the retired list: A. G. Andrews, E. H. Hodnet de Courtmacsherry, and T. C. Meikle.

ARMY MEDICAL SERVICE.

Lieutenant-Colonel Sir James K. Fowler, K.C.V.O., R.A.M.C. (T.F.), to be temporary Colonel.

ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel J. S. Green is retained on the Active List under the provisions of Articles 120 and 522, Royal Warrant for Pay and Promotion, and to be supernumerary.

Surgeon-Major W. S. Henderson, K. E. Horse, relinquishes the rank of temporary Lieutenant-Colonel on reposting.

Temporary Major E. H. Starling to be temporary Lieutenant-Colonel.

Majors relinquishing the rank of temporary Lieutenant-Colonel on reposting: R. Storrs, J. W. Jennings, D.S.O. (ret.), D. Ahern, M. C. Beatty, and (temporary) E. L. Gowlland.

The undermentioned relinquish their temporary rank: Major (temporary Lieutenant-Colonel) Richard B. Hole and Captain (temporary Major) J. W. Lane.

E. D. Hancock to be temporary Major whilst employed at the Guildford War Hospital.

The undermentioned temporary Captains relinquish their commissions: M. L. G. Hallwright, O. Eaton, A. Burton, W. D. Chambers, and E. P. Dickin.

Temporary Captain J. Craig relinquishes his commission on account of ill-health.

Temporary Lieutenants to be temporary Captains: G. H. Alabaster, E. H. Roberts, J. R. MacNeill, A. W. Harvey, H. St. A. Agate, G. M. Adam, W. A. Alexander, F. W. A. Ponsford, C. H. Lloyd, S. E. Humphreys, W. K. Bigger, H. E. P. Yorke, W. G. E. Allen, R. Farrant, W. Reid, S. Churchill, J. G. Willmore, W. C. Gowdey, F. W. Diamond, S. C. W. Morris, T. J. Costello, J. R. White, W. J. Patterson, J. L. Pearce, O. J. W. Adamson, G. B. McCaul, S. Greenwood, L. L. Fyfe, P. B. Belanger, C. D. Kean, F. R. Kirkham, P. S. Hopkins, T. A. Hindmarsh, T. F. Keenan, A. A. Wilson, I. E. Bruneau, R. T. Grant, W. F. Law, F. G. O'Donohoe, F. J. Allen, J. MacRae, A. F. Ross, A. A. O'Connor, P. P. J. Stewart, E. C. Bowden, T. C. Findlater, J. H. Davis, W. S. Hall, D. B. I. Hallett, D. J. Lewis, G. F. May, F. J. Rawlinson, H. O. Smith, J. R. K. Thomson, W. F. Hare, E. J. Griffiths, H. C. Beasley, H. H. Kendrick, D. J. McLeish, H. M. C. Green, E. H. Black, C. R. Wills, J. W. Coulter, D. B. MacLean, C. F. Knight, L. Zealand, A. F. Menzies, H. B. Lawson, H. Smurthwaite, W. Watkins, S. R. Gleed, A. B. Jones, J. M. Keegan, H. B. Walker, T. E. Cottu, C. H. Corbett, H. U. Leembruggen, S. Hodgson, J. E. Paterson, A. St. J. Bateman, H. F. T. Chambers, W. W. Linington, G. V. T. McMichael, C. Banks, J. D. Ryan, A. G. Christian, A. O'Flaherty, V. B. Kyle, J. A. V. Mathews, R. B. F. McKail, T. A. O'Brien, A. A. W. Petrie, E. J. Selby, W. R. Logan, A. Grant, T. Chalmers, J. W. Edington, A. Gillespie, W. O. Travis, C. E. Dolling, E. A. Wilson, C. A. Meaden, A. E. Hutton, J. Appleyard, J. Lamont, J. N. Donnellan, C. E. Droop, A. C. Bryson, R. Nicoll, J. A. A. Orlebar, E. S. Holloway, J. T. Grant, O. C. G. Shields, W. H. H. Parsons, M. C. Burke, G. H. Roberts, D. B. Crerar, G. L. Thornton, G. H. Brown, W. G. L. Wambeck, J. McC. Lang, G. S. Coghlan, J. B. Boyd, N. E. MacDougall, O. E. Finch, W. Scott, H. G. Hobson, R. Vincent, A. M. Roome, T. F. Craig, T. Bell, T. L. Davies, H. E. Rawlence, H. H. Serpell, A. Campbell, D. G. Wishart, R. L. Hutton, A. G. Anderson, D. R. Jones, F. V. Hanratty, R. W. L. Wallace, A. C. Rowswell, W. S. Thacker, J. J. H. Ferguson, J. D. Hart, W. Fell, T. C. Reeves, F. G. W. Deane, C. G. Galpin, R. Bruce-Low, N. Dunn, G. M. Gregoire, H. P. Gaston, and R. Stirling.

To be temporary Lieutenants: D. V. O'Malley, K. S. Macky, T. B. A. Haggard, A. Morrison, F. E. Dowling, J. L. Gordon, W. J. P. Lillis, S. Verdon-Roe, J. E. Finlay, G. Dougan, A. F. Fraser, I. W. Dickson, E. F. Hoare, G. A. Campbell, L. Bensted, F. C. Morgan, A. E. Hunter, C. W. Budden, F. Kinnear, J. F. C. O'Donohoe, H. E. T. Dawes, A. W. Brodribb, T. H. Martin, M. J. Loughrey, J. H. Fryer, P. A. Dykes, J. Graham, H. Whitwell, J. Lindsay, W. D. Hopkins, D. McCormack, F. H. Cooke, C. J. B. Pasley, D. F. Kennard, and D. Campbell (from Second Lieutenant, Indian Army Reserve of Officers).

To be temporary Honorary Lieutenants whilst serving with No. 8 British Red Cross (Baltic and Corn Exchange) Hospital: C. E. Drennan, E. Aylward, and S. Wicks.

Temporary Lieutenant R. Marshall to be temporary Honorary Lieutenant.

Temporary Lieutenants relinquishing their commissions: J. Forbes, R. McL. Wishart, W. W. Wood, J. Maxwell, T. H. D. Storms, L. E. Belcourt, M. R. Helliwell, J. J. Brown, C. A. H. Gee, W. G. Southey, C. J. Tisdall, L. Valentine, A. M. A. James, J. H. Rowe, J. Laird, G. E. Beggs, J. W. Jackson, S. R. Johnston, J. J. Thomson, P. MacKasey, G. L. Kennedy, W. J. MacNab, J. Pearson, D. K. Parkes, W. R. Taylor, P. P. Wright, B. E. Lang, O. Van Luven, D. E. Scott, E. J. de Beaupre, S. A. Overend, C. M. Keillor, H. K. Groff, R. B. Martin, K. L. MacKinnon, S. K. McKee, LeB. B. Wilmot, R. W. McQuay, J. S. Chisholm, J. H. Fisher, E. Lachopelle, W. L. Robertson, L. J. Pellew, W. Turner, and B. J. Nolan (on account of ill-health).

Temporary Honorary Lieutenant Harold L. Hughes relinquishes his commission on account of ill-health.

Temporary Honorary Lieutenants to be temporary Lieutenants: A. W. Adams and W. L. Thomas.

Canadian Army Medical Corps: To be temporary Captains: T. Coleman, W. Filmer Coy, J. G. MacNeill, W. H. McMillan, M. G. Brown, C. L. Blight, W. G. Blair, A. E. Blackett, R. A. Dowd, J. S. Fitzsimmons, E. R. Graham, S. E. Holmes, N. MacL. Harris, F. D. Sinclair, B. C. Reynolds, L. R. Shier, C. C. Schlichter, Lieutenant A. J. Lomas (Canadian Militia), E. Gardner, and J. H. Slayter.

INDIAN MEDICAL SERVICE.

Lieutenant-Colonel L. P. More, R.A.M.C., to be an Assistant Director of Medical Services, vice Colonel E. Eckersley, A.M.S.

Colonel W. R. Edwards, C.B., C.M.G., to be Surgeon-General.

Lieutenant-Colonels to be Colonels: J. T. Daly, G. J. H. Bell, C.I.E., H. Fooks, and W. H. B. Robinson.

TERRITORIAL FORCE.

Royal Army Medical Corps.

North Midland Field Ambulance: Lieutenants to be Captains: F. C. Pridham, J. Howard, and D. A. Wilson.

East Anglian Field Ambulance: Lieutenant J. Humphrey to be Captain.

Home Counties Field Ambulance: H. England and S. K. McKee (late temporary Lieutenant, R.A.M.C.) to be Lieutenants.

London General Hospital: Lieutenant-Colonel Sir J. K. Fowler, K.C.V.O., is seconded whilst holding a commission as temporary Colonel, R.A.M.C. Captain F. H. Humphris is restored to the establishment.

Western General Hospital: Captain K. W. Monsarrat is seconded whilst holding a commission as temporary Major, R.A.M.C.

North Midland Mounted Brigade Field Ambulance: Lieutenant J. M. Mitchell to be Captain.

West Lancashire Field Ambulance: Lieutenant A. V. Glendenning to be Captain.

Welsh Field Ambulance: Lieutenants to be Captains: W. Sankey and R. Willan.

Southern General Hospital: Major R. H. Lucy relinquishes his commission on account of ill-health.

Sanitary Service: R. A. Farrar, late temporary Major, R.A.M.C., to be Major (temporary), whose services will be available on mobilisation.

London Sanitary Company: Lieutenants M. S. Briggs and H. S. Tebbitt to be Captains.

London Field Ambulance: Captains M. W. K. Bird, L. Milton, C. E. Petley, W. J. T. Kimber, L. B. Clarke, L. L. Preston, A. F. Comyn, and A. B. P. Smith, from General Hospitals, to be Captains. Captain H. P. Ashe, from a London General Hospital, to be Captain.

East Anglian Casualty Clearing Station: Lieutenant (temporary Captain) F. W. Lewis to be Captain.

London Casualty Clearing Station: Captains W. H. Lloyd and W. F. B. Bensted-Smith, from General Hospitals, to be Captains.

Eastern Mounted Brigade Field Ambulance: Major W. Archibald, to be temporary Lieutenant-Colonel whilst in command of a Field Ambulance.

Highland Mounted Brigade Field Ambulance: G. W. Deeping, late temporary Lieutenant, R.A.M.C., to be Lieutenant.

South Midland Mounted Brigade Field Ambulance: Lieutenant S. P. Johnson to be Captain.

South-Western Mounted Brigade Field Ambulance: Lieutenant J. W. A. Cooper to be Captain.

East Lancashire Field Ambulance: Captain M. Moritz, from Western General Hospital, to be Captain.

South Midland Casualty Clearing Station: Lieutenant G. H. Kirby to be Captain.

Attached to Units other than Medical Units.—Surgeon Captain W. T. Rowe, from South Nottinghamshire Hussars Yeomanry, to be Captain. Captains W. K. Churchouse, D. N. Hardcastle, J. D. L. Currie, and H. A. Philpot, from General Hospitals, to be Captains. Captain J. M. Kirkness is restored to the establishment. Lieutenant B. G. Ewing to be Captain.

Supernumerary for service with the Officers Training Corps.—G. F. Blacker to be Captain for service with the Medical Unit of London University Contingent, Senior Division, Officers Training Corps.

Unattached List for the Territorial Force.—Royal College of Surgeons in Ireland Contingent, Senior Division, Officers Training Corps: Second Lieutenant A. Miller to be temporary Lieutenant whilst commanding the Contingent.

VITAL STATISTICS.

HEALTH OF ENGLISH TOWNS.

IN the 96 English and Welsh towns with populations exceeding 50,000 persons at the last Census, 7931 births and 3852 deaths were registered during the week ended Saturday, July 1st. The annual rate of mortality in these towns, which had been 12·0, 12·3, and 12·6 per 1000 in the three preceding weeks, fell in the week under notice to 11·6 per 1000 of their aggregate civil population, estimated at 17,312,295 persons for the year 1915. During the 13 weeks of last quarter the mean annual death-rate in these towns averaged 14·3, against a corresponding rate of 13·8 per 1000 in London. Among the several towns the death-rate last week ranged from 5·2 in York, 5·5 in Ealing, 6·5 in Wimbledon, 6·8 in Willesden, and 6·9 in Edmonton, to 17·4 in Cambridge, 18·6 in Preston, 18·9 in Birkenhead, 20·5 in Dudley, and 21·7 in Great Yarmouth.

The 3852 deaths from all causes were 344 fewer than the number in the previous week, and included 225 which were referred to the principal epidemic diseases, against numbers declining from 335 to 244 in the four preceding weeks. Of these 225 deaths, 68 resulted from measles, 55 from whooping-cough, 59 from infantile diarrhœal diseases, 29 from diphtheria, 13 from scarlet fever, and 10 from enteric fever, but not one from small-pox. The annual death-rate from these diseases was equal to 0·7 per 1000, and coincided with that recorded in each of the two preceding weeks. The deaths attributed to measles, which had been 70, 65, and 67 in the three preceding weeks, numbered 68 last week, and included 22 in London, 9 each in Liverpool and Sheffield, 4 in Newcastle-on-Tyne, and 3 each in Birmingham and Manchester. The deaths referred to whooping-cough, which had been 102, 76, and 77 in the three preceding weeks, fell to 55, of which 11 were registered in London, 6 in Manchester, and 3 in West Ham and Stoke-on-Trent. The fatal cases of diarrhœa and enteritis (among infants under 2 years), which had been 63, 52, and 45 in the three preceding weeks, rose to 50; 13 deaths were recorded in London, 6 in Birmingham, and 3 in Manchester. The deaths attributed to diphtheria, which had been 52, 34, and 27 in the three preceding weeks, slightly rose to 29, and included 6 in London and 2 each in Great Yarmouth, Coventry, Wallasey, and Aberdare. The deaths referred to scarlet fever, which had been 9, 9, and 15 in the three preceding weeks, fell to 13, of which 3 occurred in London and in Manchester, and 2 in St. Helens. The fatal cases of enteric fever, which had been 4, 11, and 13 in the three preceding weeks, fell to 10, and included 3 in London and 2 in Hull.

The number of scarlet fever patients under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, which had been 1313, 1302, and 1303 at the end of the three preceding weeks, declined to 1273 on Saturday last; 162 new cases were admitted during the week, against 166, 149, and 171 in the three preceding weeks. These hospitals also contained on Saturday last 1313 cases of diphtheria, 191 of measles, 184 of whooping-cough, and 47 of enteric fever, but not one of small-pox. The 904 deaths from all causes in London were 107 below the number in the previous week, and corresponded to an annual death-rate of 10·9 per 1000. The deaths referred to diseases of the respiratory system, which had increased from 117 to 157 in the four preceding weeks, fell to 107 in the week under notice.

Of the 3852 deaths from all causes in the 96 towns, 160 resulted from violence, 306 were the subject of coroners' inquests, and 1192 occurred in public institutions. The causes of 24, or 0·6 per cent., of the total deaths were not certified either by a registered medical practitioner or by a coroner after inquest. All the causes of death were duly certified in Sheffield, Leeds, Bristol, West Ham, Bradford, and in 75 other smaller towns. Of the 24 uncertified causes, 5 were registered in Birmingham, 4 in Liverpool, and 2 in Preston.

HEALTH OF SCOTCH TOWNS.

In the 16 largest Scotch towns with an aggregate population estimated at 2,372,000 persons at the middle of this year, 1119 births and 574 deaths were registered during the week ended Saturday, July 1st. The annual rate of mortality in these towns, which had been 12·9, 12·2, and 13·4 per 1000 in the three preceding weeks, fell to 12·6 per 1000 in the week under notice. During the 13 weeks of last quarter the mean annual death-rate in these towns averaged 15·3, against 14·3 per 1000 in the large English towns. Among the several towns the death-rate last week ranged from 6·4 in Kirkcaldy, 9·2 in Falkirk, and 10·0 in Perth, to 16·8 in Greenock, 18·4 in Leith, and 20·2 in Ayr.

The 574 deaths from all causes were 34 fewer than the number in the previous week, and included 54 which were referred to the principal epidemic diseases, against 39 and 52 in the two preceding weeks. Of these 54 deaths, 28 resulted from measles, 13 from infantile diarrhœal diseases, 5 each from whooping-cough and diphtheria, 2 from enteric fever, and 1 from scarlet fever, but not one from small-pox. The annual death-rate from these diseases was equal to 1·2, against 0·7 per 1000 in the large English towns. The deaths attributed to measles, which had been 13, 17, and 19 in the three preceding weeks, rose to 28, and included 18 in Glasgow, 4 in Leith, and 2 each in Dundee and Greenock. The deaths of infants (under 2 years) from diarrhœa and enteritis, which had been 12, 4, and 11 in the three preceding weeks, rose to 13, of which 4 occurred in Glasgow, 3 in Dundee, and 2 in Edinburgh. The fatal cases of whooping-cough, which had been 9, 7, and 4 in the three preceding weeks, numbered 5, and were all recorded in Glasgow. The 5 deaths from diphtheria were slightly below the average in the earlier weeks of the quarter, and comprised 2 each in Glasgow and Edinburgh and 1 in Hamilton. The fatal cases of enteric fever were recorded in Glasgow and Falkirk, and that of scarlet fever in Aberdeen.

The deaths referred to diseases of the respiratory system, which had been 92, 75, and 75 in the three preceding weeks, fell to 57 in the week under notice, and were 42 below the number registered in the corresponding week of last year. The deaths from violence numbered 22, against 14 and 28 in the two preceding weeks.

HEALTH OF IRISH TOWNS.

In the registration area of Dublin 169 births and 136 deaths were registered during the week ended Saturday, July 1st. The annual rate of mortality, which had been 17·7, 17·8, and 15·9 per 1000 in the three preceding weeks, rose to 17·3 in the week under review, against 10·9 and 12·4 per 1000 in London and Glasgow respectively.

Of the 136 deaths at all ages, 21 related to infants under 1 year and 27 to persons aged 65 years and upwards. The deaths referred to the principal epidemic diseases numbered 4, and comprised 1 each from measles, scarlet fever, diphtheria, and infantile diarrhœa.

The causes of 4 deaths were uncertified, and 1 other was the subject of a coroner's inquest, while 76, or 56 per cent., of the total deaths occurred in public institutions.

During the same period 203 births and 104 deaths were registered in the city of Belfast. The deaths corresponded to an annual rate of 13·5, or 0·5 per 1000 less than in the previous week, and included 15 of infants under 1 year of age and 17 of persons aged 65 years and upwards. The deaths from the principal epidemic diseases numbered 2, against 11 in the previous week, and both resulted from measles. All the causes of death were duly certified, and included 5 which had been the subject of coroners' inquests, while 27 of the total deaths occurred in public institutions.

VITAL STATISTICS OF LONDON DURING MAY, 1916.

In the accompanying table will be found summarised complete statistics relating to sickness and mortality in the City of London and in each of the metropolitan boroughs. With regard to the notified cases of infectious diseases, it appears that the number of persons reported to be suffering from one or other of the 10 diseases specified in the table was equal to an annual rate of 4·7 per 1000 of the civil population, estimated at 4,310,030 persons; in the three preceding months the rates had been 6·0, 5·6, and 5·3 per 1000 respectively. The lowest rates during the month were recorded in

Kensington, St. Marylebone Hampstead, Holborn, and the City of London, and the highest rates in St. Pancras, Finsbury, Shoreditch, Bethnal Green, Poplar, and Deptford. The prevalence of scarlet fever showed a considerable decline from that recorded in the preceding month; this disease was proportionally most prevalent in the month under notice in St. Pancras, Finsbury, Shoreditch, Bermondsey, and Deptford. The number of scarlet fever patients under treatment in the Metropolitan Asylums Hospitals, which had been 1956, 1735, and 1608 at the end of the three preceding months, had further fallen to 1325 at the end of May; the weekly admissions averaged 155, against 210, 208, and 190 in the three preceding months. Diphtheria was rather more prevalent than it had been in the preceding month; the greatest proportional prevalence of this disease was recorded in Finsbury, Shoreditch, Stepney, and Poplar. The Metropolitan Asylums Hospitals contained 1242 diphtheria patients at the end of May, against 1538, 1417, and 1331 at the end of the three preceding months; the weekly admissions averaged 152, against 160 and 149 in the two preceding months. The prevalence of enteric fever showed but little variation from that recorded in other recent months; of the 42 cases notified during May, 6 belonged to the City of Westminster, 5 to Kensington, 4 to Islington, 4 to Wandsworth, 3 to St. Marylebone, and 3 to Stepney. There were 30 enteric fever patients under treatment in the Metropolitan Asylums Hospitals at the end of May, against 50, 46, and 39 at the end of the three preceding months; the weekly admissions, which had averaged 7 in each of the three preceding months, declined to 5 in May. Erysipelas was proportionally most prevalent in St. Pancras, Stoke Newington, Holborn, Shoreditch, Poplar, Southwark, and Bermondsey. The 36 cases of puerperal fever notified during the month included 5 in Fulham, 4 in Islington, and 3 each in Bethnal Green, Southwark, Lambeth, Wandsworth, and Woolwich. The 52 cases of cerebro-spinal meningitis included 6 in Islington, 5 in St. Pancras, 5 in Wandsworth, 4 each in Stepney, Poplar, and Lambeth, and 3 each in Shoreditch, Bethnal Green, and Battersea. The 5 cases of poliomyelitis belonged respectively to Islington, Hackney, Bethnal Green, Stepney, and Wandsworth.

The mortality statistics in the table relate to the deaths of persons actually belonging to the several metropolitan boroughs, the deaths occurring in institutions having been distributed among the boroughs in which the deceased persons had previously resided. During the five weeks ending June 3rd the deaths of 5338 London residents were registered, equal to an annual rate of 12·9 per 1000; in the three preceding months the rates had been 14·5, 18·1, and 17·2 per 1000. The death-rates for the month ranged from 8·5 in Stoke Newington, 9·1 in Hampstead, 9·8 in the City of Westminster and in Wandsworth, 10·3 in Lewisham, and 10·7 in the City of London, to 15·4 in Chelsea, 15·7 in Deptford, 16·3 in Bermondsey, 16·5 in Shoreditch and in Poplar, and 18·6 in Finsbury. The 5338 deaths from all causes included 405 which were referred to the principal infectious diseases; of these, 115 resulted from measles, 16 from scarlet fever, 34 from diphtheria, 151 from whooping-cough, 7 from enteric fever, and 82 from diarrhœa and enteritis among children under 2 years of age. No death from any of these infectious diseases was recorded in the City of London; among the metropolitan boroughs they caused the lowest death-rates in the City of Westminster, Hampstead, Stoke Newington, Bermondsey, and Camberwell, and the highest death-rates in Chelsea, Islington, Finsbury, Shoreditch, Poplar, Deptford, and Greenwich. The 115 deaths from measles were 82 below the corrected average number in the corresponding period of the five preceding years; this disease was proportionally most fatal in May in Islington, Finsbury, Shoreditch, Poplar, Greenwich, and Deptford. The 16 cases of scarlet fever were 6 below the corrected average number, and included 2 each in St. Pancras, Shoreditch, and Southwark. The 34 deaths from diphtheria showed a decline of 11 from the corrected average, and included 7 in Wandsworth, 3 each in Hammersmith, Chelsea, and Finsbury, and 2 each in St. Pancras, Stepney, Poplar, and Southwark. The 151 deaths from whooping-cough were 15 in excess of the corrected average; this disease was proportionally most fatal in Fulham,

ANALYSIS OF SICKNESS AND MORTALITY STATISTICS IN LONDON DURING MAY, 1916.

(*Specially compiled for* THE LANCET.)

CITIES AND BOROUGHS.	Estimated civil population, 1915.	NOTIFIED CASES OF INFECTIOUS DISEASE.											DEATHS FROM PRINCIPAL INFECTIOUS DISEASES.									
		Small-pox.	Scarlet fever.	Diphtheria.*	Typhus fever.	Enteric fever.	Other continued fevers.	Puerperal fever.	Erysipelas.	Cerebro-spinal meningitis.	Poliomyelitis.	Total.	Annual rate per 1000 persons living.	Small-pox.	Measles.	Scarlet fever.	Diphtheria.*	Whooping-cough.	Enteric fever.	Diarrhœa and enteritis (under 2 years).	Total.	Annual rate per 1000 persons living.	Deaths from all causes.	Death-rate per 1000 living.
LONDON	**4,310,030**	**1**	**813**	**768**	**—**	**42**	**2**	**36**	**224**	**52**	**5**	**1943**	**4·7**	**—**	**115**	**16**	**34**	**151**	**7**	**82**	**405**	**1·0**	**5338**	**12·9**
West Districts.																								
Paddington	131,397	—	20	28	—	2	—	—	5	1	—	56	4·4	—	1	—	1	5	—	5	12	1·0	166	13·2
Kensington	155,795	—	15	18	—	5	—	2	2	2	—	44	2·9	—	3	—	—	3	—	3	9	0·6	214	14·3
Hammersmith	118,559	—	21	23	—	1	—	1	4	—	—	50	4·4	—	3	—	3	2	—	3	11	1·0	132	11·6
Fulham	151,161	1	20	21	—	—	—	5	4	2	—	53	3·7	—	3	—	1	9	—	3	16	1·1	166	11·5
Chelsea	58,421	—	15	9	—	—	—	—	1	—	—	25	4·5	—	2	—	3	1	—	2	8	1·4	86	15·4
City of Westminster	135,104	—	9	28	—	6	—	2	4	—	—	49	3·8	—	—	—	1	2	—	1	4	0·3	127	9·8
North Districts.																								
St. Marylebone	100,260	—	10	8	—	3	—	—	6	—	—	27	2·8	—	1	—	—	7	1	—	9	0·9	137	14·3
Hampstead	81,760	—	8	9	—	—	—	—	5	—	—	22	2·8	—	—	—	—	1	—	—	1	0·1	71	9·1
St. Pancras	209,322	—	68	46	—	1	1	2	18	5	—	141	7·3	—	6	2	2	8	1	6	25	1·3	255	13·3
Islington	316,242	—	60	54	—	4	—	4	16	6	1	145	4·8	—	20	1	—	13	1	11	46	1·5	456	15·0
Stoke Newington	50,527	—	8	2	—	—	—	—	4	1	—	15	3·1	—	—	1	—	—	—	—	1	0·2	41	8·5
Hackney	217,883	—	29	30	—	1	—	—	11	2	1	74	3·5	—	11	1	1	9	1	3	26	1·2	249	11·9
Central Districts.																								
Holborn	40,405	—	1	5	—	—	—	—	3	—	—	9	2·3	—	2	—	1	1	—	—	4	1·0	58	15·0
Finsbury	76,915	—	23	26	—	—	—	—	2	—	—	51	6·9	—	6	—	3	3	—	2	14	1·9	137	18·6
City of London	19,461	—	1	—	—	—	—	—	2	1	—	4	2·1	—	—	—	—	—	—	—	—	—	20	10·7
East Districts.																								
Shoreditch	103,627	—	35	37	—	1	—	—	9	3	—	85	8·6	—	7	2	1	9	—	2	21	2·1	164	16·5
Bethnal Green	120,207	—	31	31	—	1	—	3	6	3	1	76	6·6	—	—	1	—	11	—	—	12	1·0	135	11·7
Stepney	265,731	—	54	77	—	3	—	2	13	4	1	154	6·0	—	7	1	2	15	1	8	34	1·3	344	13·5
Poplar	156,247	—	37	44	—	1	—	2	16	4	—	104	6·9	—	9	—	2	7	1	8	27	1·8	247	16·5
South Districts.																								
Southwark	179,424	—	26	30	—	1	—	3	19	2	—	81	4·7	—	6	2	2	6	—	1	17	1·0	252	14·7
Bermondsey	117,188	—	38	17	—	1	—	—	11	1	—	68	6·1	—	—	—	1	2	—	2	5	0·4	183	16·3
Lambeth	284,188	—	57	33	—	2	1	3	7	4	—	107	3·9	—	6	—	—	9	1	6	22	0·8	340	12·5
Battersea	161,945	—	27	22	—	—	—	—	8	3	—	60	3·9	—	1	1	1	3	—	2	8	0·5	184	11·8
Wandsworth	312,249	—	56	45	—	4	—	3	13	5	1	127	4·2	—	1	1	7	5	—	4	18	0·6	293	9·8
Camberwell	254,385	—	43	41	—	1	—	—	8	1	—	94	3·9	—	3	—	—	5	—	2	10	0·4	282	11·6
Deptford	110,299	—	34	23	—	1	—	—	8	1	—	67	6·3	—	8	1	—	2	—	4	15	1·4	166	15·7
Greenwich	96,385	—	21	19	—	2	—	—	6	—	—	48	5·2	—	8	1	—	3	—	3	15	1·6	133	14·4
Lewisham	164,438	—	22	21	—	—	—	1	7	1	—	52	3·3	—	1	—	1	5	—	1	8	0·5	163	10·3
Woolwich	129,505	—	24	19	—	1	—	3	6	—	—	53	4·3	—	—	1	1	5	—	—	7	0·6	137	11·0
Port of London	—	—	—	2	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—

* Including membranous croup.

St. Marylebone, Shoreditch, Bethnal Green, and Stepney. The 7 fatal cases of enteric fever were 4 below the corrected average, and belonged respectively to St. Marylebone, St. Pancras, Islington, Hackney, Stepney, Poplar, and Lambeth. The 82 deaths from diarrhœa and enteritis among children under 2 years of age were 8 below the corrected average; the greatest proportional mortality from this cause in May was recorded in Paddington, Chelsea, Poplar, Deptford, and Greenwich. In conclusion, it may be stated that the aggregate mortality in London during May from the principal infectious diseases was 21·0 per cent. below the average.

Obituary.

HENRY BENJAMIN HINTON, M.R.C.S.:

A CENTENARIAN DOCTOR.

Surgeon-Major Henry Benjamin Hinton, who has recently died at Adelaide, South Australia, was in his 104th year and the senior Member of the Royal College of Surgeons of England. He was born two years before the Battle of Waterloo at Southsea (Portsmouth) on March 7th, 1813. One of his immediate relatives was Dr. James Hinton, who had secured fame as an ear surgeon—a fact which it is thought had some influence on his career, as he selected the medical profession as the field of his life's work. From 1832–34 he was a student at the London Hospital, and afterwards went to the Westminster Hospital. On May 25th, 1835, he became a Member of the Royal College of Surgeons of England. He was appointed surgeon on the East Indiaman *Broadholme* in 1835, and made three voyages to Calcutta. His first army appointment was as an assistant surgeon in the Bengal army in 1839. He served in the Arracan district of Burma for some three years, and then was transferred to Gwalior and assisted in tending the wounded at the battle of Maharajpore. In 1846 he was present at Aliwal in the first Sikh War and at Sobraon, and received the medal and clasp. He was at Delhi in the same year, and also participated in the second Sikh War of 1848–49 and in the Mutiny of 1857. In 1858–60 he volunteered for work in China and served with the 70th Native Infantry in Canton, and obtained the campaign medal and received a similar token for his work in the Bhootan Campaign of 1864–65. In 1869, acting on medical advice, Mr. Hinton retired from the service and went to Australia. He lived in Tasmania and also in Melbourne and Geelong, and finally settled in South Australia. Mr. Hinton was congratulated by the Council of the Royal College of Surgeons of England on attaining his 100th birthday in 1912, but in the same year had the misfortune to sustain a painful accident, and a fractured thigh bone kept him in hospital for some time. Despite his accident he displayed extraordinary vitality until a short time before his death. He enjoyed excellent health for his years and retained his mental faculties in a wonderful degree. In his early life he was obliged to wear glasses, but these he abandoned in middle age. Towards the close of his long life he could read books and write his letters without any artificial aid to his sight. He was a non-smoker, practically a total abstainer, and a small eater. Mrs. L. H. Sholl, of Adelaide, and Mr. Reginald Hinton, of Tasmania, are the two surviving children.

DONATIONS AND BEQUESTS.—The Directors of the Powell Duffryn Steam Coal Company have given £1000 towards the proposed extensions to King Edward VII. Hospital at Cardiff.—The Lord Mayor of Leeds has received a contribution of £3600 from the estate of the late Mrs. Sarah L. S. Geldart towards the extension of the Leeds General Infirmary.

QUEEN'S UNIVERSITY, BELFAST.—At the final degree examinations in medicine, out of 35 candidates 27 passed. The success of the women candidates was remarkable. Miss Grace English was first of all the candidates, gaining the £20 prize, and first in obstetrics, for which she was awarded the £30 scholarship; Miss M. Purce was second of all the candidates, and won the £30 exhibition for being first in medicine; while Mr. Joseph P. McGinley was third candidate, and was first in surgery and obtained the £30 prize. All three candidates were awarded first-class honours.

Correspondence.

"Audi alteram partem."

THE REGISTERED PRACTITIONER AND THE UNCERTIFIED MATERNITY NURSE.

To the Editor of THE LANCET.

SIR,—I am directed by the President of the General Medical Council and the chairman of the Central Midwives Board to send you for publication the accompanying copy of a correspondence which has recently taken place between a registered medical practitioner in England and the chairman of the Central Midwives Board with regard to the conditions under which a medical practitioner may properly coöperate with an uncertified woman, not being a nurse employed by him, in attending a maternity case.

I am, Sir, yours faithfully,

G. W. DUNCAN,
Secretary, Central Midwives Board.

Westminster, S.W., July 3rd, 1916.

[COPY.]

DEAR SIR,—Do you mind telling me if, in your opinion, the following case is that of "covering an uncertified midwife"? Mrs. ——, who was in practice before the Act, and who has since been crossed off the Roll, or to be strictly accurate, has resigned, still acts as a nurse, and tells everybody who comes to her that she cannot act without a doctor, and sends all the people to me. Am I justified in going to them? The instruction I give is that they are to send for me directly they want me, and in the event of the child being born before I arrive that the placenta is always to be kept for me to see.

As I have been in practice over 35 years, and done a good deal of midwifery, I am naturally anxious not to break the law, and sooner than do that would rather tell Mrs. —— that I cannot go with her, either as a nurse or in any other capacity. I am sorry to trouble you, but believe you are the chairman of the Central Midwives Board.

Yours truly,
——

June 8th, 1916.

DEAR SIR,—In reply to your letter of June 8th, forwarded to me, in such a case as that which you mention—the woman having already been struck off the Midwives Roll or having resigned—

You must take care that it is clearly understood that any patients whom you attend with Mrs. —— are *your* patients and not hers, though she may have sent them.

In any dispute on this point the C.M.B. always goes on this principle, that the case belongs to the person who has undertaken to attend the confinement, *whenever it occurs* (day or night), *even if normal*. A monthly nurse summons the doctor so that *he* may conduct the delivery.

In many of the disputed cases it has been plain to the Board that this arrangement has not been made, but that the midwife and doctor have agreed that the doctor should *not* be called at night except in case of some abnormality, *or* that he should not be called to deliver *at any time* except in case of some abnormality.

In these cases the Board holds that the case belongs to the *woman*, and that the doctor is covering her.

In your case I should *write* your instructions to the midwife, and should keep a copy in case of any dispute.

There is nothing to prevent Mrs. —— from acting as a *monthly nurse* under your orders. *You* are responsible for the cases, and for Mrs. —— nursing of them.

I am glad to help you, and only wish that more practitioners would adopt the course which you have adopted.

Believe me, yours very faithfully,
F. H. CHAMPNEYS.

Littlemead, Nutley, Uckfield, June 12th, 1916.

DEAR SIR,—I am more than grateful to you for your letter and advice. I have written to Mrs. —— and enclose you a copy.

I wish to carry out the Act both in the spirit as well as the letter, and am naturally anxious not to run any risk myself.

With kind regards, Yours truly,
——

June 14th, 1916.

[COPY.]

TO MRS. ——.—I have made enquiries, and am quite willing to go with you: 1. If you act as nurse *only*. 2. If you look on the patient as *my* patient. 3. If you send for me *before* the child is born. The only exception to this is where it is born in a hurry before your arrival, or directly after, before you have time to send. 4. If you cannot keep to these instructions I cannot go with you at all.

June 14th, 1916. ——

THE CAUSATION AND CURE OF CERTAIN LUNACIES.

To the Editor of THE LANCET.

SIR,—It may not be too late to refer to a communication with the above title in your issue of June 24th. Captain Rupert Farrant, the author, appears to have gone to foreign parts on service and to have left us to support, with such fortitude and philosophy as we may, the concussion effects of the following (amongst other) high explosives until such time as he returns, as we trust he may ere long, and in fettle to deal with the bemused claimants to his attention.

Mental cases and others have been examined for the presence of toxæmias inducing the alteration in the glands (i.e., endocrinal glands). ..... It is deduced that many cases of lunacy may be classified according to the toxæmia present, and the change that it has induced in the ductless glands.

I dare say many of us will be prepared to face yet another classification of insanity if at last we are presented with one based upon pathology. Until, however, Captain Farrant demonstrates a toxin, or toxins, in a case of insanity, and proves experimentally that such has caused a change in the ductless glands, no value will be attached to this deduction.

In primary and secondary amentia atrophy of the pineal, pituitary, and thyroid were found in three main groups of cases.

I do not know what is meant by "primary and secondary amentia," nor do I understand how three groups of cases are spread over two morbid states; but in any case, an atrophy of these glands is not by any means found only in association with a particular variety or varieties of mental deficiency or disease. I deny that any significance whatever can be attached to this condition, upon the basis of any work done up to the close of 1914; and a considerable amount of such work had by then been recorded.

The pituitary gland was found sometimes to have given rise (*sic*) to symptoms of hyperpituitarism, to apituitarism in idiocy, dementia præcox, and other forms of insanity.

I commend this sentence to Dr. Mercier's notice. If by it is meant that disease of a gland sometimes gives rise to specific symptoms associated with loss, impairment, or derangement of the function of that gland, that has no bearing upon the pathogenesis of any form of insanity.

Streptococci were found up to 100 per cent. and the total exclusion of bacillus coli in some cases of mania.

The first portion of this statement is meaningless. Is it intended to convey that the number of streptococci per gramme of fæces is increased, and, if so, by how much? Such work as Barton White and I were able to do in this direction[1] showed that there was no increase in these organisms in acute mania and melancholia. The second part of the statement is startling. Our experience showed that B. coli was increased in acute mania, and even Pardo (whose work I refer to in the lectures cited), who claims to have demonstrated that the putrefactive anaerobes are increased in this disorder at the expense of B. coli and B. aerogenes, does not claim to have observed a complete disappearance of B. coli.

In adults certain toxæmias react on these glands, especially the thyroid and pituitary, and induce stimulation, hypertrophy, and finally atrophy. ..... The alteration in the amount of secretion induces an altered mental state, and this, combined with the effect of the toxæmia, renders the patient insane, or liable to insanity from slight mental stress.

As to this we require evidence of the particular toxin concerned—evidence that this acts on certain glands, and, so acting, induces the conditions mentioned; evidence that alteration in amount of secretion induces an altered mental state; evidence that toxæmia renders, or helps to render, a patient insane.

The whole of this utterance is *ex cathedrâ*, valueless, and unscientific, in my opinion. Of a piece with it is the further assertion that—

alteration in the sexual glands ..... leads to altered mentality up to insanity.

The lines on which beneficial treatment may be carried out, based on the above pathology, become obvious.

Unfortunately, the "pathology" is by no means obvious.

Toxæmias, if present, should be removed.

By all means let that be done when their presence has been demonstrated.

The glands should be allowed to involute if they are hypertrophied.

Certainly, by kind permission of the impresario, I mean the doctor; for he, dread man, can, of course, withhold consent, prevent involution, and thus damn the proceedings.

I am, Sir, yours faithfully,

Cardiff, July 3rd, 1916. EDWIN GOODALL.

[1] Croonian Lectures. THE LANCET, Dec. 5th (p. 1287), 12th (p. 1343), 19th (p. 1397), and 26th (p. 1451), 1914.

THE NEEDS OF THE ROYAL MEDICAL BENEVOLENT FUND.

To the Editor of THE LANCET.

SIR,—The Royal Medical Benevolent Fund, the great benevolent society of the medical profession, is sorely in want of money now. Though in ordinary times the medical profession supports its own poor, in these war times this is no longer possible. At the May meeting the committee had a balance of only £17 in hand, and at the June meeting was faced with a deficit of £16. The demands were heavy and had to be met, and this could only be done by withdrawing £500 from the bank. As the direct outcome of the war, not only are the ordinary cases of poverty greatly increased in number, but an entirely new class of case has arisen urgently requiring relief, in which, without actual poverty, there is great temporary distress—distress, however, which it is hoped will relieve itself soon after the war is over and the doctors serving return to their civil duties.

At the outbreak of war the medical profession responded freely to the nation's call. The Territorial medical officers were at once called out, and other medical men volunteered. Both alike had to leave their practice at very short notice, and often without being able to make adequate provision for its continuance and maintenance during their absence. Their pay went but little way to supply the loss which their absence entailed, for the working expenses of the practice could not be materially reduced. The result was that many families found themselves in very straitened circumstances. Rent, rates, and insurance brook no delay, but, worst of all, school-bills could not be paid, and if help had not been quickly forthcoming the children would have suffered for the patriotism of their father.

The following are typical of the cases with which our Fund has had to deal:—

A young doctor who had only been in practice a few years volunteered for service, and was killed in action a few days later. He left a widow, aged 35, with two young boys, aged 3½ and 1 year, entirely without means. The Fund voted £25 for her immediate necessities, and put her into communication with the Officers' Families Association, which gave further help.

A practitioner, aged 38, earning £700 to £800, volunteered for service, leaving his practice in the hands of a neighbour, who was not a success. There were two young children, and another baby was born shortly after the husband left. The wife contracted pneumonia and nearly died. A resident patient had to leave the house. Rent and other expenses led to a debt of about £80. This the doctor could not meet, and he hurried back from the trenches to save his home from being sold up. The Fund voted £25, the Guild gave £15, the Officers Families Association £25, and the Professional Classes War Relief Council further help, with the result that he returned to the front with his immediate anxieties relieved.

A captain in the Territorials was called out and had to leave his practice in the hands of a locum, who proved a failure. There were seven children, aged 2 to 14. Financial difficulties arose, and payment of the school fees became impossible. Between the Fund and Guild, and Officers' Families Association, the necessary fees were raised, and clothing, which was greatly required, provided.

These cases show well the way in which the Fund works, not only by giving relief itself in money and kind, but also by obtaining, through coöperation with other benevolent societies, more substantial assistance than it could afford alone.

But there is another class in which the distress is perhaps even greater and adequate relief more difficult. It is that of men who left home and a good practice in vigorous health and who have come back, crippled by wounds or with health impaired, to a practice severely damaged by their absence and without the strength or energy to regain the practice and position which they sacrificed. Our Fund has set apart a special sum to meet emergency claims of this kind, yet the demands are so great that it will soon be exhausted. We cannot now rely on the profession alone to supplement it largely, for the medical profession, like all other professions, is hit very hard by the war and has no longer its old resources to draw upon. What is required is an emergency fund large enough to deal adequately with these emergency cases arising directly out of the war, and for this we are

driven to appeal to the public as well as to our own profession.

We trust that our appeal will meet with a liberal response both from the public and from the medical profession, for unless fresh funds are quickly forthcoming it will be impossible to continue the relief which is so urgently required.—We are, Sir, yours faithfully,

JOHN TWEEDY, President.
SAMUEL WEST, Hon. Treasurer.
G. NEWTON PITT, Hon. Secretary.

11, Chandos-street, Cavendish-square,
London, W., July 1st, 1916.

THE MEDICAL DIRECTORY.

To the Editor of THE LANCET.

SIR,—Our annual circular has been posted to the profession to-day. In view of the difficulties in obtaining labour, we are most anxious to have returns made to us as promptly as possible. We hope that practitioners who are serving in the navy and army will have arranged for their circulars to be forwarded to them.

We are, Sir, yours faithfully,

July 4th, 1916. J. AND A. CHURCHILL.

WOMEN STUDENTS AT THE LONDON HOSPITALS.

To the Editor of THE LANCET.

SIR,—I note that in your issue of July 1st Professor W. D. Halliburton states "that St. George's Hospital has made a step forward in admitting a limited number of women students to 'their' wards, and that the experiment has proved such a complete success that he is hopeful that other hospitals will follow their example." Professor Halliburton, however, does not mention the fact, of which he is doubtless aware, that St Mary's Hospital has already thrown open its doors to women students at the request of the authorities of the London School of Medicine for Women.

Since May 1st women students have been admitted to the wards of St. Mary's Hospital for clinical instruction, and at the present time 12 are working there. This number, it is expected, will be largely augmented in October. No request was made for admission of women students to courses of instruction in preliminary or intermediate subjects.

In justice to St. Mary's Hospital Medical School, I have thought it my duty to place these facts before you.

I am, Sir, yours faithfully,
JOHN F. H. BROADBENT,

July 3rd, 1916. Dean of St. Mary's Hospital Medical School.

SPINAL ANÆSTHESIA, WITH REFERENCE TO ITS USE IN THE TRENDELENBURG POSITION.

To the Editor of THE LANCET.

SIR,—Will you allow me to add the following remarks to my paper on the above subject in answer to Mr. A. G. Stewart's letter, which appeared in your issue of June 24th?

In the case of the child aged 3 the injection was made in the third lumbar space; in the others in the second lumbar space. I was aware of the continental work done in relation to this position, and I heard Professor Jonnesco give his interesting lecture on high spinal anæsthesia at the Royal Society of Medicine in 1909, and, of course, did not mean to claim any originality. As to the general anæsthetic given in combination, I have used spinal anæsthesia in the dorsal position in many abdominal operations without any general anæsthetic, but our object in these cases in giving a very small amount of general anæsthetic was to prevent psychic shock and to do away with the discomfort of the position. I am, Sir, yours faithfully,

July 3rd, 1916. H. M. PAGE.

ALIMENTARY REST IN DIABETES.

To the Editor of THE LANCET.

SIR,—Your leading article in to-day's issue does very scant justice to F. M. Allen. Allen bases his methods of treatment upon experimental work on animals and not upon hypotheses, in this it differs from that of Guelpa. Many of his followers have taken but a few steps along his path and failed to see the goal. The word "drastic" when applied to a treatment is misleading. The prolonged fast is an essential part of the treatment, and any case which is not submitted to alimentary rest until sugar disappears from the urine has not been treated by Allen's method and should not be included in records under that heading. The reason for the fast is not that it leads to the disappearance of sugar from the urine—that observation is simply a convenient method of determining that the fast has been of sufficient duration—but that it leads to an alteration in metabolism which permits a greater katabolism of carbohydrates. In my experience the severe cases prove the value of the method, the chronic cases yield to treatment which does not test so severely the control of the patient.

Although many hundreds of cases have been treated in America, many suffering from severe disease, with most happy results, let us wait until we have more evidence before we pass judgment, but do not let us prejudice the case by asserting that the treatment is of less value in severe cases than in mild.—I am, Sir, yours faithfully,

Portland-place, W., July 1st, 1916. O. LEYTON.

THE STRETCHING OF SCAR TISSUES IN MOUTH LESIONS.

To the Editor of THE LANCET.

SIR,—The description of a simple device for stretching scar tissue associated with mouth lesions may perhaps be of some value at the present moment. Its use applies particularly to those cases where the lip and cheek are bound down by scar tissue to the subjacent structures. The apparatus consists of a ring made with rubber tubing into which wire is introduced, the free ends of the tubing being fastened together to form a complete ring. The ring is placed between the lip and cheek on the one side and the gum, supported by bone on the other side in such a manner as to bring pressure to bear upon the scar tissue. By increasing the size of the tubing and the tension of the wire the pressure can be increased without causing discomfort to the patient beyond the presence of the apparatus. No. 8 size of tubing has been used most frequently at the commencement. The wire used is similar to that used as a driving cord for dental engines; it is twisted spirally. The ends of the tubing are fastened together with rubber solution, one end being made to overlap the other.

Previous to the introduction of this apparatus I had for some years been using pads of cotton-wool and simple tubing which has not been strengthened, but used chiefly in a U form. The chief use formerly has been to free the lip in cases of hare-lip. The method was referred to by me at the recent discussion upon injuries of the jaws at the Royal Society of Medicine.

I am, Sir, yours faithfully,
W. WARWICK JAMES.

Park-crescent, Portland-place, W., June 27th, 1916.

ENTERIC FEVERS IN THE TROPICS: A POINT IN NOMENCLATURE.

To the Editor of THE LANCET.

SIR,—With reference to the slight change which will be made in the "heading" of the section referring to typhoid and paratyphoid fevers in the August number of the *Tropical Diseases Bulletin* it may be safely stated that the medical profession is not satisfied with the present classification of the "typhoid fevers" or with that of the bacilli which cause the separate infections. There is a fairly well marked group of "enteric fevers" having certain features in common, and if those diseases are grouped under the word "enteric" the bacilli naturally fall into a genus "enterica" with: *Enterica typhosa* = *B. typhosus*, *E. mitis* = *B. paratyphosus A.* and *E. icteriformis* = *B. paratyphosus B.* To adopt any such change of nomenclature without the consent of a majority would only create further confusion. The present suggestion is made with a view to attracting attention to an unsatisfactory state of things.

I am, Sir, yours faithfully,
J. H. TULL WALSH,

Kingston Hill, July 4th, 1916. Lieutenant-Colonel, I.M.S. (retd.)

The War.

THE CASUALTY LIST.

THE following names of medical officers appear among the casualties announced since our last issue :—

Killed.

Captain K. H. A. Kellie, R.A.M.C., was educated at Cambridge and at St. George's Hospital, London, and qualified in 1903. He was a well-known rowing man, and held appointments at several London hospitals, and was in consulting practice in Queen Anne-street before joining the R.A.M.C. in April, 1915.

Lieutenant J. B. Haverson, R.A.M.C., who came over with the Canadian Contingent, graduated at the Manitoba Medical College in 1915.

Died.

Major G. H. M. Dunlop, R.A.M.C., qualified M.B. at Edinburgh University in 1880, and was in practice at Abercrombie-place, Edinburgh, when war broke out.

Lieutenant J. St. J. Dundon, R.A.M.C., qualified recently, and thereupon joined the R.A.M.C.

Captain N. J. Hofmeyr, South African Medical Corps.

Wounded.

Captain T. C. Clarke, R.A.M.C.

Lieutenant E. C. Lambert, R.A.M.C., attached to the East Surrey Regiment.

Lieutenant R. C. B. Briscoe, R.A.M.C.

Lieutenant D. St. C. Creighton, R.A.M.C., attached to the Royal Field Artillery.

Lieutenant V. F. Stock, R.A.M.C.

Lieutenant J. Unsworth, R.A.M.C.

Captain N. Black, R.A.M.C., attached to the Argyll and Sutherland Highlanders.

Captain W. T. Smith, R.A.M.C., attached to the King's Liverpool Regiment.

Believed to have been taken Prisoner at Kut-el-Amara.

Major E. F. E. Baines, I.M.S.

DEATHS AMONG THE SONS OF MEDICAL MEN.

The following sons of medical men must be added to our lists of those who have fallen during the war :—

Armourer-Corporal J. O'D. Watson, 10th Battalion Canadian Infantry, only son of the late Lieutenant-Colonel J. Watson, R.A.M.C.

Lieutenant E. H. Bird, Royal Fusiliers, attached to the Royal Flying Corps, second son of the late Dr. A. H. Bird.

Lieutenant H. A. Llewellyn, South Wales Borderers, only son of the late Dr. J. D. Llewellyn, of Bargoed, South Wales.

Lieutenant J. J. Ball, Royal Field Artillery, only son of Dr. J. B. Ball, of Upper Wimpole-street, London.

Private C. P. S. Morris, Canadian Infantry, son of Dr. C. E. Morris, of London, Ontario.

MENTIONED IN DESPATCHES.

In a despatch received from Lieutenant-General J. C. Smuts, Commander-in-Chief of the East African Force, dated June 30th, 1916, the names of the following medical officers are mentioned :—

Staff.—Maj. R. T. Brown, R.A.M.C.; Col. (temp. Surg.-Gen.) G. D. Hunter, C.B., C.M.G., D.S.O., A.M.S.; Lt.-Col. C. A. Johnston, I.M.S.; Lt.-Col. C. J. O'Gorman, D.S.O., R.A.M.C.; Lt.-Col. R. G. Turner, I.M.S.

Faridkot Imperial Service Sappers and Miners.—1st Class Sub-Assist. Surg. Majid Abdul.

Royal Army Medical Corps.—Capt. C. V. Thornton.

South African Army Medical Corps.—Capt. S. G. Grinsell.

East African Medical Corps.—Lt.-Col. A. D. Milne; Capt. J. McP. Mackinnon; Temp. Capt. C. J. Wilson.

Indian Medical Service.—Maj. E. T. Harris; Maj. C. G. Seymour; Capt. G. T. Burke; Capt. R. S. Townsend.

Indian Subordinate Medical Department.—3rd Class Assist. Surg. A. R. Emmett.

In a despatch received from General Sir Beauchamp Duff, Commander-in-Chief in India, the names of the following medical officers are mentioned :—

Capt. F. R. Coppinger, R.A.M.C.; Maj. T. B. Kelly, I.M.S.; Lt.-Col. L. F. Smith, R.A.M.C.; Lt. J. S. Townley, R.A.M.C. (T.F.); Assist. Surg. E. H. Gillson, I.S.M.D.; Maj. G. E. Cathcart, R.A.M.C.; Lt.-Col. B. R. Chatterton, I.M.S.; Capt. J. Cunningham, I.M.S.; Maj. J. K. S. Fleming, I.M.S.; Lt.-Col. R. J. W. Mawhinny, R.A.M.C.; Maj. G. F. Rugg, R.A.M.C.; 1st Class Assist. Surg. E. V. Duckworth; 4th Class Assist. Surg. A. N. Quick.

The names of two civilian medical men, Dr. A. Macrae and Dr. J. C. Young, of the Keith Falconer Mission, are also mentioned.

OBITUARY OF THE WAR.

SIDNEY EDWARD PUNCH, L.R.C.P. & S. IREL.,

SURGEON, ROYAL NAVY.

Surgeon S. E. Punch, who lost his life on H.M.S. *Indefatigable* in the naval engagement of May 31st, was in his thirty-first year and son of the late Philip Edward Punch of Ardfoile, Cork. He was educated at Clongowes Wood College, Co. Kildare, and Ampleforth College, Yorkshire, and then spent five years in his father's office (wholesale tea merchants) before entering University College, Cork, as a medical student. After studying in Dublin he passed his qualifying examination in 1912, entering the navy three months later. Surgeon Punch was good at field sports; he played in his University College Rugby fifteen and in the cricket eleven, was fond of sailing, and had won prizes in diving competitions.

A senior colleague writes thus of Surgeon Punch: "Though only four years in the Naval Medical Service before meeting his death, Sidney Punch had already endeared himself to hundreds of naval officers and men. His was a charming personality, always cheery—sometimes under circumstances that might well depress many another man—willing to help others, a loyal and cheerful assistant. He took part in all sports, and was ready to take as good as he gave. Punch was, to sum up in a single sentence, 'A good Irishman.'"

HUGH LEIGH NORRIS, M.R.C.S. ENG., L.R.C.P. LOND.,

FLEET SURGEON, ROYAL NAVY.

Fleet-Surgeon H. L. Norris, who was lost on H.M.S. *Indefatigable* in the naval engagement on May 31st, was son of the late Dr. Henry Edmonds Norris of Charmouth, and grandson of Captain Marryat, the famous writer. He was educated at Dulwich College and St. Thomas's Hospital, qualifying in 1898 and entering the navy in the same year. Fleet-Surgeon Norris's activities were not confined to his professional work, he was an artist of some ability, and his sketches were of use to the service. Following in his grandfather's footsteps, he published two books, "Rice Papers" and "China Side," besides contributions to various journals, including *Punch*. He was good at games, a good average football player, and devoted to sailing.

A colleague writes of Fleet-Surgeon Norris: "It was on his return home from abroad, where he had seen active service, and at the Royal Naval Barracks, Portsmouth, to which he had been appointed, that I renewed my friendship with Norris and again enjoyed his genial wit and ready smile and the manly qualities which so endeared him to his messmates. By his medical colleagues and patients alike he was deservedly held in high esteem, for he possessed a high professional knowledge and an intimate comprehension of the

bluejacket. Though he had all the sailor's love of home, the call of the sea was in his blood, and when, after a brief spell of shore service, he was appointed to the *Indefatigable*, he answered the summons with willingness and that devotion to duty that had marked his service career. Fallen in action now, he leaves many friends to mourn him. The Naval Medical Service has lost a valued officer and the navy a very gallant one."

EDMUND HUGHES FLANIGAN, M.B., B.CH. R.U.I.,

LIEUTENANT, ROYAL ARMY MEDICAL CORPS.

Lieutenant E. H. Flanigan, whose death occurred at Belfast, on June 17th, as the result of an illness contracted on active service, was the eldest son of the late Mr. Patrick Flanigan. Educated at Clongowes College and University College, Dublin, he qualified in 1908, and after practising for a short time in Belfast went out to South Africa in 1910, where he engaged in practice at Penhalonga, in Southern Rhodesia. On the outbreak of war Dr. Flanigan volunteered for war service, and obtained a commission in the Royal Army Medical Corps, being invalided home in February last.

Lieutenant Flanigan was a popular figure in Belfast, well esteemed as an able practitioner, and possessed of a wide circle of friends. He married in South Africa Miss Mary E. Greenwood, of Grahamstown, who was engaged in nursing during the Boer war, and recently on a hospital ship. To his widow and friends we tender our sincere sympathy.

THE BRITISH INTERNED PRISONERS OF WAR AT CHÂTEAU D'OEX.

The British chaplain at Château d'Oex, the Rev. E. Dudley Lampen, M.A., writes as follows:—The improvement in the men's general health even in such a brief period as a fortnight is very marked. They arrived at Château d'Oex in a pitiable condition, utterly worn out. To-day many are walking about apparently well, although a closer acquaintanceship shows that they are still suffering terribly from the effects of their wounds and the terrible experiences they have passed through. Many of the men state that they have met with kindness and skill in German hospitals, and the impression gained from talks with them is that both German doctors and nurses are humane and have usually done all that was possible. On the other hand, the men speak of unnecessary pain inflicted by operations conducted without anæsthetics, general or local. One man had four major operations without chloroform, and no doubt more might have been done to relieve pain and to straighten limbs. Stories are told of ligaments severed and injuries done in hospital to produce permanent lameness. A large number of men are suffering from leg and foot wounds, and shots through the lungs are frequent; head wounds rarer. The use of steel helmets seems to have saved lives. A remarkable coincidence is that of a man who was shot through the lungs, the bullet entering one side through the rib and passing out on the other; in the South African War he had an exactly similar wound about an inch lower down. One of the worst cases is that of blood poisoning. This man was ordered to go down a coal mine and work there. He refused and was put to work on the coke at the surface. A scratch on the arm produced a poisoned wound. He applied to the doctor for treatment and was told that he could expect no assistance after having refused to work in the mine. Later he became so ill that they were obliged to take him to hospital where he lay four months. He is still in bed here but rapidly recovering with care and good food. Many of the soldiers are suffering from nervous strain, due to ill-treatment and insufficient food in German camps. A man who was constantly trembling said: "It's that barbed wire." The sense of being continually shut in, continually watched by a sentinel at every hand, reacts on the men's nerves. It is an immediate relief to them to find in Château d'Oex a complete freedom from barbed wire and sentries. The attempt of the Germans to break the spirit of our men has failed, but it has left its mark. For the most trivial offences the men were punished. One said he was tied to a tree for two hours in the cold. Another told how a man was tied to a post head downwards and was only released on the indignant expostulations of the other men. A number of men are from the notorious Wittenberg Camp. They confirm with poignant additions all that has been reported in many newspapers. The loss of limbs among this contingent is not very noticeable, though there are some lacking an arm or a leg. Crutches are being used by about 50 men. Cases of "gassing" do not seem to have come here to any great extent, though there are a few.

Malnutrition has to account for the bad health of many. One man related how in his camp, when they went to bathe they hardly dared to look at each other they were so emaciated. For the most part the parcels from home and from Switzerland were the only suitable food, but it is not to be supposed that, in every case where a post-card was received from the man to say he had enjoyed the parcel, he had necessarily been allowed to have it. As a punishment for the slightest offence, such as not saluting a German officer whom the soldier may not have noticed, the man was told: "You will not have your parcel from home, but all the same you must write the card to say you have had it and that you are quite well," when the reverse was the case. If he refused, all his parcels and letters were held back for some time.

A Swiss doctor confidently asserts to us that there is good hope of greatly improving the condition of most of the cases of crippling. No doubt a long time has elapsed since some of the injuries were received, but all that the latest methods can effect will be done to enable the men to recover the use of their limbs. The Swiss practice is to get the men as soon as possible into the open. Most of the hotels and pensions where the men are located are furnished with balconies, where sun and air baths can be obtained. So far the weather has been unfavourable for sun baths, but as soon as summer weather comes much benefit is expected from the action of the solar rays. Exercise is also encouraged within strict limits and under medical supervision. The hotels and pensions are divided into sections, each of five doctors taking one of the larger hotels and one or more pensions. The food is good, plain, and abundant. The following scheme has been issued by the chief doctor, reckoned as per man per day (grammes where not otherwise stated): Bread, 400; milk, 750; meat, weighed without bone, 175; potatoes or macaroni, rice, peas, &c., 100–150; soups, 50; vegetables, for 10 centimes; cheese or bacon, or sausages of the same nutritive value, 40; coffee, 8; cocoa, 20; butter, 10–20; jam, 20; sugar, 2 pieces. The menus are as follows:—Breakfast: Bread, milk, coffee or cocoa, jam, butter. Dinner: Soup (500 gm. with 50 gm. farinaceous), meat, potatoes, vegetables, coffee (black). Supper: Thick soup (500 gm. with 100 gm. farinaceous), cheese or bacon, or sausages, macaroni or rice, salad. The men are well content with the food, are thriving upon it, and their comfort is generally looked after. They occupy well-furnished rooms, sleep on box-spring beds, wool or hair mattresses, and have feather pillows. Extras, such as beef-tea, wine, and brandy, are ordered only by the doctors, and are provided by the British authorities at Berne, acting through the local civilian committee.

TESTS FOR THE DETECTION OF MALINGERING AMONG SOLDIERS.

A correspondent who is *médecin-en-chef* under the French Service de Santé of a military hospital in Savoy has recently seen a case of croton-oil dermatitis and two of artificial abscess, one from turpentine and one from paraffin, in soldiers who were not anxious to return to the fighting line. In other cases of non-tangible complaints such as sciatica and rheumatism, he has suspected malingering but has not been in a position definitely to prove it. He sends some notes of the latest methods for identifying the pus of

artificial abscesses and for the detection of egg albumin in urine, as well as a note on the jaundice caused by the ingestion of picric acid.

Tests for Turpentine and Paraffin in the Pus of Artificial Abscesses.[1]

Microchemical tests.—The pus from an abscess caused by turpentine or paraffin contains oily globules visible on microscopical examination. Just as fats do, these globules reduce osmic acid in presence of Nile blue, paraffin a golden yellow, turpentine brownish-yellow. The action of the staining agent attains its maximum if we take the precaution to deposit it beforehand on the glass side on which the pus is to be spread, by simple evaporation of a drop of the alcoholic solution: Nile blue 0·20 gm. in 20 c.c. of 95 per cent. alcohol. In contrast with the vegetable oils, fatty globules of vaseline or oil of vaseline, possibly derived from the dressings, the droplets of turpentine dry in the open air. These latter droplets moreover are alone soluble in ethylic aldehyde. To ascertain that such is the case we introduce one or two drops of aldehyde between the slide and the cover glass stained with Nile blue, watching under the microscope the action of the solvent on the tinted droplets.

Macroscopic reactions.—If we treat pus from such an abscess with alcohol at 90° (2 c.c. of pus in 5 c.c. of alcohol) any turpentine or paraffin therein contained will be dissolved. (*a*) If to 2 c.c. of water we add two drops of the preceding alcoholic solution and one drop of ordinary commercial formol we witness a deep-brown grenadine tint if the pus contains paraffin. (*b*) The alcoholic solution (5 to 10 c.c.) poured into a large quantity of water (450 c.c.) saturated with picric acid when shaken leaves on the surface of the liquid droplets or an oily ring coloured orange-yellow in the case of paraffin, colourless in presence of turpentine. The smell will enable us to distinguish between turpentine and paraffin. (*c*) A small quantity of butter of antimony ($SbCl_3$) on a platinum wire, plunged into the air of the recipient, turns reddish-brown in presence of turpentine vapour (Ribau's test). (*d*) Lastly, in a subject who has induced abscess formation by the injection of essence of turpentine the urine often presents an odour of violets when passed.

The Detection of Egg-Albumin in Urine.[2]

Egg-albumin is often made use of in order to simulate albuminuria. A little white of egg is beaten up with plain water and allowed to deposit. Only the upper part of the liquid, containing very little albumin, is employed. In some instances the malingerer himself injects it into the urethra or into the bladder by the aid of an ordinary gonorrhœal syringe. In others he keeps it in a small phial, which he hides "up his sleeve" and adds to the urine as he passes it. To determine the presence of egg-albumin proceed as follows: (1) Take 5 c.c. of the suspected urine and introduce right to the bottom of the tube, without mixing, 5 c.c. of Maurel's test solution. Should the urine contain egg-albumin a precipitate forms, either at once or in the course of a few minutes, at the line of junction of the two fluids. On mixing the two fluids the precipitate rapidly increases. This gives no precipitate with sero-albumin. In some rare instances, however, in the absence of egg-albumin, we meet with a precipitation ring when the urine contains a large proportion of aceto-soluble albumin, albumoses, or blood, but on shaking up the precipitate dissolves, or at any rate does not increase. A mixture of equal parts of ordinary commercial formol and glacial acetic acid behaves like Maurel's test solution. Maurel's test solution has the following composition: Solution of caustic soda 33 per cent., 25 c.c.; solution of sulphate of copper 3 per cent., 5 c.c.; glacial acetic acid, 70 c.c.

Biochemical reactions.—When we obtain a positive reaction with Maurel's solution and the aceto-formol solution, the biochemical reactions of the precipitates must be ascertained in a suitably equipped laboratory. With this object in view prepare rabbit anti-ovalbumin by the repeated subcutaneous injection at six days' interval (six in all) of 2 c.c. of pure ovalbumin obtained under aseptic conditions. The rabbit blood is obtained by introducing a platinum needle into the marginal vein of the ear. The blood is allowed to coagulate; the supernatant serum is decanted and placed in 5 c.c. ampoules, then being placed for half an hour in the warm chamber at 56° C. The test is applied as follows: Pour 1 c.c. of the filtered urine into a small test-tube (same as used for Wassermann reaction); introduce 8 drops of anti-ovalbumin. The drops of serum fall to the bottom of the tube and set up a copious precipitate if the urine contains ovalbumin; in the contrary event the urine remains clear. The serum must not deposit in presence of normal solution or normal urine. These tests do not exclude other methods of investigation nor the close observation of the subject, washing out the bladder, &c. Sometimes the malingerer operates more clumsily, making use of a strong solution of ovalbumin, in which case the proportion of albumin is necessarily high, with numerous threads and colourless globoid masses, easily seen by oblique illumination, floating in the urine.

A Note on Jaundice Caused by the Ingestion of Picric Acid.[3]

Picric acid in the organism is transformed by reduction into picramic acid and even into a more advanced derivative, triaminophenol and others which are eliminated in the urine. It is very uncommon to find traces of actual picric acid. In order to form an idea as to the nature of the products eliminated and the duration of the elimination of a small quantity of picric acid, just enough to provoke slight jaundice, an assistant was good enough to swallow 20 centigrammes of the powder in a cachet. Within two hours and a half his urine began to show traces of reduction products more advanced than picramic acid. The proportion steadily increased, and seven hours after the ingestion of the acid traces of picramic acid began to appear. On the morrow—i.e., 26 hours after ingestion—the sclerotics were faintly jaundiced and at the same time the urine became pomegranate red. This slight jaundice, which might easily have escaped notice, only lasted seven or eight hours. The next day the colour of the urine had returned to its normal yellow, though a shade darker than usual. In man the elimination of a large quantity of picric acid may take upwards of 20 days. Picramic acid is turned yellow by strong acids, red by alkalies. The picramates are very soluble in water, whereas picramic acid, very slightly so, is readily taken up by organic solvents, especially acetic ether, ordinary ether, and chloroform. Picramic acid is a fast stain for wool, colouring it a reddish brown. The colour of picramic urine is usually orange-red (pomegranate) varying in depth, sometimes blood-red or almost black. Nevertheless, a urine normal in colour may contain traces of picramic acid without being red, in which case there is usually no concomitant jaundice. With acids the red colour turns yellow. For instance, in testing for albumin with aseptol, sulphosalicylic acid, or nitric acid, we get a yellow zone above the acid. Picramic urine, normally acid, remains sweet for a long time. In neutral or alkaline urine on the contrary the picramic derivatives disappear more or less rapidly, within a few hours, from the urine. It is therefore important to make the examination as soon as possible after the emission of the specimen.

M. de Mithouard has provided us with a very delicate test for traces of picric acid, as also of picramic acid and the more advanced reduction products. Pour 2 c.c. of the suspected urine into a test-tube and 1·3 c.c. of ammonia. Shake and introduce with a drawn-out pipette about 1 c.c. of the ferrous-tartrate test solution (free ferrous sulphate 2 grammes, tartaric acid 10 grammes, water 100 c.c.) conveying it to the bottom of the test-tube. At the junction of the two layers we get a ring of more or less deep cherry-red colour best seen against a white background with the back to the light. When the urine contains more advanced reduction products than picramic acid we see below the red ring, from which it is usually separated by a colourless area, a blue ring of variable intensity. The diazoreaction, invented by Mr. Derrien for picramic acid, is less sensitive. Into a test-tube containing 2 c.c. of the suspected urine put one drop of sulphuric acid (25 per cent.) and two drops of a 1 in 10,000 solution of nitrite of soda. Heat exactly one minute in a boiling water bath, cool under a stream of cold water. Add 3 c.c. of ether and three drops of ammonia saturated with naphthol. On shaking up, the ether assumes a violet-red colour. If we add to picramic urine a solution of subacetate of lead, drop by drop, shaking well after each addition, at a given moment the precipitate assumes a flesh or salmon tint. The addition of chloride of barium causes an orange precipitate varying in depth.

To extract picramic acid from urine in order to afford convincing evidence of its presence, and at the same time to provide a *pièce de conviction*, we proceed as follows: Into a decantation vessel pour about 100 c.c. of urine, slightly acidified with a few drops of acetic or phosphoric acid (for very dark urines 10 c.c. will be sufficient, while for yellow urines we must use as much as 150 or 200 c.c.), add about 25 c.c. of acetic ether, then, having corked the bottle, shake up thoroughly in order to dissolve the picramic acid. Set aside, separate the lower liquid (if the acetic acid should have formed an emulsion this is broken up by adding a few drops of alcohol or by filtering the liquid through a plug of cotton-wool). Exhaust the urine twice more with acetic ether (15 c.c. each time). The acetic ether, coloured a more or less orange-yellow, is filtered, then slowly evaporated in a little capsule with a few inches of woollen thread. To the residue add 500 c.c. of water, heat for 10 or 15 minutes in a boiling water-bath or nearly to boiling point. Place the skein of wool in a little glass vessel, squeeze it with a glass rod against the edge of the recipient and wash with a few drops of water. Then wash in plenty of water, soap well, rinse, and dry. Apply the ferrous tartrate and the diazoreaction test to the liquid left in the capsule, mixed if necessary with that in the glass. Part of the dyed, dried wool will serve as *pièce de conviction* and is annexed to the report. Later on, should any doubt remain in the mind of the jury, some other expert can discover the presence of picramic acid for himself. The rest of the wool is placed in a test-tube with 2 or 3 c.c. of water and three or four drops of ammonia. On heating, the picramic acid dissolves, giving an orange-yellow colour of variable depth to the liquid in which the presence of picramic derivatives can be revealed by the ferrous tartrate test and the diazoreaction. Acetic ether can be replaced by ordinary ether or chloroform. In some instances, especially when the urine is not clear, it is better to clarify it by means of a 10 per cent. solution of Courtonne's liquid (neutral acetate of lead) before commencing the test. Or we may add to the urine 10 or 100 c.c. according to the tinge, a slight excess of chloride of barium. The precipitate, washed in a small quantity of water, is decomposed by means of a solution of sulphate of soda and a few drops of sulphuric acid. Exhaust with acetic acid or ether and continue as above.

Although these may not be the favourite forms of malingering, if it exists, in this country, the notes are nevertheless suggestive of the kind of evidence which it is desirable to adduce in these very difficult cases. The number of cases of malingering in either the French or the English army has been extraordinarily few.

PHYSICAL CLINIQUE FOR WOUNDED AND DISABLED SOLDIERS.—This institution has now been opened at 126, Great Portland-street, W., and was on view last week, when it was visited by Queen Alexandra and by the Princess Louise. Treatment is entirely free of charge. Every case will be examined by a member of the honorary medical staff, of whom we gave the names in our issue of June 24th. Medical men who have under their care officers who they think would benefit by physical treatment are cordially invited to consult the clinique. A complete installation of whirlpool baths has been presented, and the committee and their friends have contributed some £300. It is estimated that a further sum of £3000 is required to meet the initial outlay and cover the rent and running expenses for a period of 12 months. It is specially hoped that a donor may be found for the mechanical apparatus which has cost about £190 and excited a considerable interest among the visitors last week.

BOOKS FOR BRITISH PRISONERS ABROAD.—Regimental care committees and relatives and friends of British prisoners of war will do them a good service by

[1] From the Military Analytical Laboratory at Chambéry: Dr. A. Hollande. [2] Ibid.

[3] From the laboratory of testing of the Military Hospital Desgenettes at Lyons.

bringing to the notice of the interned in their letters to them the fact that, if they are desirous of carrying on serious reading, they can obtain free of charge educational books on almost any subject by writing to Mr. A. T. Davies at the Board of Education, Whitehall, London, S.W. To facilitate the despatch of parcels and books and, if possible, the organisation of an educational library in every camp, all applications for books should, as a rule, be sent through, or endorsed by, the senior or other responsible British officer or non-commissioned officer in the camp. Where for any reason (which should be stated in the application) this course is impracticable requests from individual prisoners will as far as possible be acceded to.

AMBULANCE GIFTS TO THE RED CROSS.—A convoy of motor ambulance cars which have been purchased with part of £40,000 subscribed by the members of Lloyd's and presented to the French army were inspected by the King at Buckingham Palace on June 24th. The convoy includes 20 ambulances, two reserve ambulances, a travelling workshop, and a staff car. Another convoy purchased by the British Sportsmen's Motor Ambulance Fund was inspected on the same day by Queen Alexandra at Marlborough House, and afterwards handed over to the Wounded Allies Relief Committee. On June 27th the King inspected 25 motor ambulances presented to the Red Cross Society by brewers. Owing mainly to the efforts of a little girl, the daughter of a Burnley miner, a fully equipped ambulance has been presented to the Red Cross. The money has been collected from the workpeople of Burnley mostly in pennies, and totalled over £1100. In making an inspection of the ambulance on June 29th at Marlborough House, Queen Alexandra remarked that the efforts of the little girl supplied a useful object lesson to any who because they could not do very much might be discouraged from doing anything. Other recent gifts to the Red Cross include a fully equipped motor ambulance by the Amalgamated Society of Watermen, Lightermen, and Bargemen.—During the first five months of the present year Mme. Clara Butt has raised £5365 for the Red Cross Society and the Order of St. John.

DENTAL MOTOR AMBULANCES.—The London Committee of the French Red Cross have sent to the front three dental ambulances, one presented by Miss Kathleen Woodburne, of Leeds, another by the city of Glasgow, and a third by a group of manufacturers of dental requisites. A qualified dental surgeon will be in charge of the ambulances and the chauffeur of each car will be a dental mechanic.

MARYLEBONE MEDICAL WAR COMMITTEE.—At a meeting of the registered medical practitioners of the borough of St. Marylebone held on June 26th, the number of the new Local Professional Committee was fixed at 15 with power to coöpt up to 20. The following candidates were elected—namely, Dr. E. A. Boyd, Dr. G. Blacker, Mr. W. McAdam Eccles, Mr. N. Bishop Harman, Mr. B. F. Hartzhorne, Mr. R. Lake, Dr. W. H. Neale, Mr. J. Irwin Palmer, Mr. J. Pollard, Dr. E. Tait Robinson, Sir Ronald Ross, Dr. D. Roxburgh, Mr. W. G. Spencer, Dr. Seymour Taylor, and Dr. R. H. Wilbe. The committee was authorised to fill vacancies occurring at any time, subject to the approval of the Central Medical War Committee.

GRANTS FOR BELGIAN PRISONERS.—The Wounded Allies Relief Committee has arranged for two special grants to be made to the Committee for the Relief of Belgian Prisoners in Germany. These grants will benefit not only sick and wounded Belgian prisoners in Germany, but also those interned in Switzerland.

THE CARNEGIE TRUST IN IRELAND.—Reference has been made in THE LANCET to the investigation being conducted in England by Professor E. W. Hope on behalf of the Carnegie United Kingdom Trust. A similar investigation for Ireland has been entrusted to Dr. E. Coey Bigger, medical inspector of the Local Government Board. A circular letter outlining the proposed scheme, and asking for information on certain points, has been addressed by the Local Government Board to the several local health authorities. The outline of the scheme covers the following points: Organisation of house visiting, particularly of expectant mothers and of young children; the establishment of maternity centres; the provision of midwifery facilities; and the maintenance of day nurseries. Local health authorities are invited to coöperate as far as possible with local associations and local philanthropic efforts.

Medical News.

UNIVERSITY OF MANCHESTER.—**The Graduation** Ceremonial took place on July 1st. From the annual statement of the Vice-Chancellor we learn that 1300 past and present members of the University are serving with H.M. Forces in the war or engaged in approved war service. The number of students who have withdrawn to join the Forces or render national service during the present session is 160. Adding these to the 230 who had previously withdrawn, this gives a total of 390 students on military, naval, or other service. There are 52 members of the teaching staff with military or naval duties, while 26 members of the medical staff are members of the R.A.M.C. The number of past and present students who have been killed in action, or who have died through the war, or who are reported as "missing" has now reached 90. The number of students in the Faculty of Medicine in 1915–16 was 281, as compared with 256 in 1914–15, and 305 in 1913–14, while in all faculties in 1915–16, the number was 1165, as compared with 1415 and 1654 in the previous two years. There are now 67 women in the Faculty of Medicine. As the number of men students has been largely reduced owing to the war, it is estimated that the number of men students next session may not exceed 375, including technology. A gift of £50 has been made by an anonymous donor for an entrance scholarship in the Faculty of Medicine of £25, tenable for two years. A considerable number of degrees were conferred *in absentia*. In the Faculty of Medicine the degree of M.D. was conferred *in absentia* on Lovel Moss and William Stirling, jun., both of whom are on active service abroad.

At examinations held recently the following candidates were successful:—

FINAL M.B. AND CH.B.

J. H. Albinson, H. Chadwick, R. Chevassut, W. Christopher, R. Colley, W. C. C. Easton, *E. W. Fish, Eva L. Glasier, G. Lapage, R. L. Newell, F. C. Ormerod, Nesta H. Perry, Dorothy Potts, and G. B. Wild.

Forensic Medicine and Toxicology.—G. E. Archer, Alice M. A. Arnold, Mercy D. Barber, W. T. G. Boul, Hilda K. Brade, Frances G. Bullough, C. F. J. Carruthers, Kathleen L. Cass, Ruth E. Conway, J. Holker, N. Kletz, E. N. P. Martland, J. A. Panton, R. S. Paterson, A. B. Platt, Elizabeth C. Powell, J. Shlosberg, D. M. Sutherland, and H. Taylor.

* Awarded distinction in Surgery.

THIRD M.B. AND CH.B.

Pharmacology and Therapeutics and Hygiene.—N. Abdoh, T. H. Almond, Sybil Bailey, T. Colley, S. E. Critchley, F. L. Heap, A. N. Kirkham, J. Mills, Kathleen O'Donnell, Harriet R. L. Reid, Norah H. Schuster, L. J. Schwartz, Marie Wardman, and F. L. Whincup.

Hygiene.—Mary G. Cardwell, Ellis Pigott, H. T. Savage, V. T. Smith, and G. R. Wadsworth.

Diploma in Dentistry (Final Examination).—G. P. Anderson, B. C. Betts, S. K. Gibson, R. D. Hankinson, H. Masters, and G. C. Royley.

Dental Surgery, Dental Prosthetics, and Operative Dentistry.—T. F. Healey.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH.—At the recent Dental Examinations just concluded the following candidates passed the First Dental Examination:—

Euphemia Ross Macdonald and Leonard Lee Isaacs.

The following passed in the subject of Chemistry and Physics:—

Gilbert Dilworth and Wycliffe Hoghton.

At the same diet the following candidates passed the Final Examination and were granted the diploma L.D.S. R.C.S. Edin.:—

Duncan Macgregor, Edinburgh; Sampson Mathews Anderson, Co. Antrim; and G. Jacobus Bayers, South Africa.

UNIVERSITY OF DURHAM: FACULTY OF MEDICINE.—At examinations held recently the following candidates satisfied the examiners:—

FIRST EXAMINATION FOR THE DEGREE OF BACHELOR OF MEDICINE.

Elementary Anatomy and Biology, Chemistry, and Physics.—John Edmund Basham, Walter Nigel Crowe, Eric Cresswell Dagger, Samuel Whately Davidson, Edgar Reginald Dingle, Kate Gray, Mary Louise Griffiths, Geoffrey Arthur Haydock, Margaret Barbara Herbst, William Ewan Douglas Hodgson, Dorothy Holmes (second-class honours), Harold Holtby, Leonard Hunter, Henry Norman Clarence Jaffé (second-class honours), Edith Catherine Morris Jones (second-class honours), Thomas Hobson Kirk, James Joseph Laydon, Malik Abdur Rahman Mansoor, George McCoull, Maurice Myers (second-class honours), Thomas Swinhoe Severs, Joseph Silverston, Rev. James Stonehouse, Kathleen Mary Weldon Watts, Arthur Guy Weston, and Athelstan Woodman, M.A.

SECOND EXAMINATION FOR THE DEGREE OF BACHELOR OF MEDICINE.

Anatomy and Physiology.—Charles Nathaniel Armstrong (second-class honours), Paige Canney Arnold (second-class honours), Dorothy Olga Sutherland Blair, Ernest Dewar Charles (second-class honours), William Devereux Forrest, Eskander Girgis, Mary Isabel Alleyne Grimmer, John Hetherington, George Hurrell, Louis Lavine, Robert Sanderson, Robert Paulin Wanless, and Angus Hedley Whyte.

THIRD EXAMINATION FOR THE DEGREE OF BACHELOR OF MEDICINE.

Materia Medica, Pharmacology and Pharmacy; Public Health; Medical Jurisprudence; Pathology and Elementary Bacteriology.—Ewart Gordon Anderson (second-class honours), Wallace Alexander Freedman (second-class honours), John Gilmour (second-class honours), Mary Kathleen Henegan, William Arthur Jaques, Phyllis Marriott, Bertram Sergeant, and William Edward Mandall Wardill

EXAMINATIONS FOR THE LICENCE IN DENTAL SURGERY (L.D.S.).

First Examination: Chemistry and Physics.—William Alfred Cowden.

Second Examination: Dental Mechanics and Dental Metallurgy.—Arthur Ernest Murray and Fred Wilkinson.

Third Examination: Anatomy, Physiology, and Histology, Dental Anatomy, Dental Histology, and Dental Materia Medica.—Wilfred Phillipson Spence.

THE OXFORD OPHTHALMOLOGICAL CONGRESS.—As already announced, this Congress will assemble next Wednesday at Keble College, Oxford, and the two following days will be devoted to addresses and discussion. Ophthalmological instruments and apparatus will be exhibited in the anatomical department of the University Museum. The honorary secretary of the Congress is Mr. Bernard Cridland, Salisbury House, Wolverhampton.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.—The annual general meeting of this society will be held at the West London Hospital, Hammersmith, on Friday, July 21st, at 5 P.M., when the annual report of council and the financial statements of the treasurer and of the editorial secretary will be presented and the officers elected for the session 1916-17.

LITERARY INTELLIGENCE.—Dr. T. N. Kelynack is editorially supervising a guide to public and personal service in war time which is to be issued shortly by Messrs. John Bale, Sons, and Danielsson under the title of "Pro Patria." The book will describe the chief organisations and institutions which are engaged in war work, and will include a list of Red Cross hospitals.

THE LONDON INSURANCE COMMITTEE AND ILLEGIBLE PRESCRIPTIONS.—One of the cases of complaint against medical men on the London panel investigated by the Medical Service Subcommittee and reported upon to the Insurance Committee at a recent meeting had an element of novelty. The attention of the Subcommittee was called by the father of an insured patient to a prescription furnished by the medical practitioner in question which was absolutely illegible. As a consequence it could not be dispensed, and was forwarded to the Committee's office, whence a telegram was sent to the practitioner who eventually rectified the matter. Through this the patient was without medicine for three days. Of the illegibility of the prescription there was no question. The Subcommittee reported that its medical members could not decipher either the name of the patient or of the practitioner, nor could they determine any of the drugs which the practitioner wished to be employed. As an explanation he stated that his handwriting was never clear, and that he had either written the prescription in a bad light or his pencil had failed him. He also stated that he constantly suffered from heart attacks which were apt to render his writing worse. The Subcommittee went into the question thoroughly, calling for other prescriptions in order to compare them, one of which the practitioner was asked to interpret. He said that it ordered Lotio Plumbi, but it was found that the druggist who had been asked to make it had read it as Mistura Senegæ L.I.P. This must have seemed serious enough to the Subcommittee, but it was rendered even worse by the practitioner's admission that Mistura Senegæ L.I.P. was what he had in fact intended the patient to obtain. The prescription which formed the subject of the inquiry he said was for Mist. Gent. L.I.P., but when his attention was called to the fact that there are three gentian mixtures in the London Insurance Pharmacopœia he said that he meant to order Mist. Gent. Co. It was therefore clear that even he could not read his handwriting. As a result the Subcommittee recommended that the medical man should be severely censured and cautioned. It may be noted that the Insurance Committee had ordered the inquiry to be held in spite of the complaint having been withdrawn by those entitled to make it. In the course of its report upon this case the Medical Service Subcommittee made the observation that "medical practitioners should write prescriptions in such a manner as to enable them to be read without difficulty by the chemists to whom they are presented." It might be added to this that bad or careless writing may, either through the delay occasioned or through a misinterpretation on the part of the dispenser, be responsible for serious results, and that, leaving the welfare of the patient out of consideration, the risk of an action for negligence being brought is not one to be despised. In the case under comment the Subcommittee also remarked with regard to the alleged state of the practitioner's health that it might be "one of the causes of the extraordinary prescriptions which he seems to issue from time to time." Here again, in addition to the risk to the patient, there must necessarily be danger of serious consequences to the practitioner.

SOUTH LONDON HOSPITAL FOR WOMEN.—The new in-patient department of the South London Hospital for Women at 103, South Side, Clapham Common, was formally opened by the Queen on Tuesday last, and is expected to be ready for patients in a few weeks' time. The hospital, which was instituted in 1912 as a general hospital for the treatment of women and children, is designed to accommodate 80 patients, and includes paying wards where a fee of £1 1*s.* to £3 3*s.* a week will be charged. The general wards are all cross-ventilated single wards, each isolated from atmospheric connexion with any other part of the hospital. Arrangement for open-air treatment is secured by forming all roofs as flats and attaching balconies to all the wards. In the wards themselves natural ventilation is relied on, with extract and inlet flues, and arrangements for additional electric fans if required later. Both the interior and exterior finish to the entire hospital afford impervious surfaces capable of being washed down. An out-patient department has been in existence at Newington Causeway since April, 1913, two houses having been adapted for the purpose. The hospital has been built at the expense of anonymous donors. It is officered entirely by women, the only male employees being the engineer-in-charge and the stoker. The medical staff includes, Mrs. Scharlieb, M.D., M.S. (Consulting Surgeon), Miss M. H. Fraser, M.B., B.S. (Physician), Miss M. M. Chadburn, M.D., B.S. (Surgeon), Miss A. M. Roberts, M.D., B.S. (Ophthalmic Surgeon), Miss E. H. Lepper, M.B., B.S., Miss I. Pulteney, M.D., Miss M. G. Thackrah, M.D., B.S. (Assistant Physicians), Miss J. H. Turnbull, M.D., B.S., Miss E. Davies-Colley, M.D., F.R.C.S. (Assistant Surgeons), Miss C. Bernard, M.A., L.M.S.S.A. (Radiographer), and Miss G. Brooks, M.B., B.S. (Anæsthetist).

Parliamentary Intelligence.

HOUSE OF COMMONS.

WEDNESDAY, JUNE 28TH.

Dublin Castle Hospital.

Answering Mr. GINNELL, who asked questions about Dublin Castle Hospital, Mr. TENNANT (Under Secretary for War) wrote: The ventilation carried out by nine large windows and two doors is quite ample, irrespective of the height of the ceiling. Daily outdoor exercise for prisoner patients has not been curtailed. Each patient capable of walking gets one hour's exercise daily. The time is deemed sufficient by the visiting medical staff. The hours allotted for visitors to Sinn Fein prisoners have not been restricted and are similar to those allowed for visitors to wounded soldiers. The Sinn Fein prisoners are in every way treated from the point of view of accommodation, medical attendance, and food in exactly the same way as are the wounded soldiers of the British expeditionary forces, for which purpose Dublin Castle Hospital was instituted.

THURSDAY, JUNE 29TH.

Sick and Wounded Soldiers.

Mr. KING asked the Home Secretary whether during the last two months any more lunacy institutions had been handed over in part or entirely for the accommodation of soldiers or sailors.—Mr. BRACE (for Mr. H. SAMUEL) replied: The Northampton County Asylum, Berrywood, and the remainder of the Middlesex County Asylum, Napsbury, were handed over for the accommodation of sick and wounded soldiers on April 30th and May 14th respectively.

Mr. KING asked the Under Secretary for War whether it was in contemplation to take over from asylum authorities any further accommodation for uncertifiable nerve-shaken soldiers or sailors who were in consequence to be placed, as in the Middlesex county asylum, under asylum management.—Mr. TENNANT answered: No, Sir.

Consent to Surgical Operations.

Mr. CHANCELLOR asked the Under Secretary for War whether a man who had been passed into the army suffering from a disease believed to be curable by a surgical operation could, while in the Army, be forced to undergo such operation without his consent.—Mr. TENNANT replied: The man's consent is always obtained before an operation is performed on him.

Mr. SNOWDEN: In the case of a minor is the consent of the parent necessary?—Mr. TENNANT: In that case I think recourse would be had to the parents.

Re-examination of Rejected Recruits.

Mr. HOGGE asked the Under Secretary for War why the War Office had ordered 300,000 copies of Army Form W 3299, and whether it was their intention to use them in recalling men already rejected on previous occasions as medically unfit, or whether the War Office still adhered to the pledge given by him on May 24th.—Mr. TENNANT answered: It is the intention of the War Office to use Army Form W 3299 for the purpose of calling up for re-examination those men

who, under the instructions issued, are liable to be summoned for medical re-examination. There is no ground for the suggestion that anything inconsistent with what I said on May 24th will be done. It is very difficult to say what number will be called up, and there is no means of ascertaining it.

Exemptions to Dentists.

Mr. PAGET asked the Under Secretary for War whether he had seen the resolutions passed by the borough of Cambridge deprecating the action of the military authorities in withdrawing dentists from the practice of their profession and putting them to do the work of ordinary soldiers; and what was the policy of the War Office in the matter.—Mr. TENNANT wrote in reply: I have not seen the resolution to which the honourable Member refers. Claims for the exemption of dental surgeons whose services the principal medical officer considers indispensable have been assented to conditionally on their services with the troops being continued. In other cases dentists have recourse to the tribunals in the ordinary way. A decision by the Central Tribunal in a recent case has been circulated to tribunals. In this case the dentist was granted exemption conditionally on his remaining in his present occupation. The following was added: "The Central Tribunal, from evidence submitted to them, are impressed with the danger of further reducing the number of registered dentists now in this country. Whether any particular dentist should be granted exemption must obviously depend to some extent upon the requirements of the place in which he practises, but they are inclined to think that unless it be shown that his services are not required, he should be granted exemption. Similar considerations apply to the mechanics on whom dentists depend for the efficient performance of their work."

Treatment of Tuberculosis in Poor-houses.

Mr. CURRIE asked the representative of the National Insurance Commissioners whether the practice which at one time caused dissatisfaction in Scotland of treating tuberculosis cases in poor-houses was now entirely forbidden as regards both soldiers and civilians; and whether the public might rely upon no reversion to this practice being permitted.—Mr. CHARLES ROBERTS said in reply: No such arrangement as is indicated in the question can be made by insurance committees under the National Insurance Acts. If the honourable Member will furnish me with further information as to any specific case which he may have in mind, I shall be glad to make inquiry.

Work of the Board of Control.

Mr. KING asked the Under Secretary for the Home Department whether the five Lunacy Commissioners now employed entirely on lunacy work were found sufficient for all the requirements of the Lunacy Acts, seeing that 14,000 beds had now been removed from lunacy jurisdiction.—Mr. BRACE answered: The work of the Board of Control has been carried out by the Commissioners working long hours, and at the expense of their usual vacation, by the assistance given to them by one of the honorary Commissioners, and by special arrangement of their work of a temporary nature.

Mr. KING: In any further reduction will it be observed that at least the legal members of that Commission or the Board of Control will not be reduced in their capabilities and numbers?—Mr. BRACE: I think that the honourable Member may depend upon the Home Office doing that.

Non-poisonous Dope in Aircraft Factories.

In the course of the debate on the Home Office Estimates in Committee of Supply, Mr. BRACE (Under Secretary for the Home Department) said: The troublesome question of a non-poisonous dope in aircraft factories is a matter on which the Home Office has been much disturbed. We have had to answer questions in this House in regard to women and men whose lives have been taken because of their having to work this poisonous dope. The dope question affects not only the Home Office, but also, and more particularly, the Admiralty and the War Office. I am glad to be able to say that as a result of communications between the Home Secretary and the Ministers of those two departments we at last see our way to having a non-poisonous dope sufficient and effective for all purposes for aircraft, whether for sea work or for work on land. I am hoping that within a few weeks from now the poisonous dope which has been in use and has been so deadly to the workers will be a thing of the past. The Home Office has been continually pressing for the best ventilation, for greater precautions, and for everything in the shape of pre cautionary measures that would make work upon poisonous dope less dangerous. But we have felt all along that the real solution of the question was a non-poisonous dope. It has been a very difficult problem. The three departments concerned have been working together, and as a result I think the noble lord who brought forward this question (Lord Henry Cavendish-Bentinck) may take it for certain that within a very short time all this danger will be removed and the workers in our aircraft factories will be able to go about their employment with infinitely less danger to life and health than has hitherto been the case.

MONDAY, JULY 3RD.

Nervous Cases in the Navy.

Answering Commander BELLAIRS, who asked questions about the measures being taken to deal with cases of acute mental and nervous breakdown in the navy, Mr. MACNAMARA (Secretary to the Admiralty) wrote: The treatment of all cases of mental and nervous breakdown is undertaken in the three large base naval hospitals at Chatham, Haslar, and Plymouth. A medical officer who has made a specialty of such cases is detailed to each hospital, and he has so many beds allotted to him as is necessary. The treatment adopted is not to collect these cases in one ward or one building, but to separate them from each other, as far as possible treating them with other general cases of illness. So far this method of treatment has been followed by favourable results, but the number of cases of this type from the Fleet is not sufficiently large to enable more than a probable estimate of its value to be formed as yet. Later on it is hoped a detailed report of the results obtained will be of value.

Time-expired Men of the Royal Army Medical Corps.

Mr. WATT asked the Under Secretary for War whether he was aware that time-expired men of the Royal Army Medical Corps on offering themselves for re-enlistment were being told that they could not be reinstated in that corps, and were being relegated to rifle battalions; would he say whether this was done with the sanction and concurrence of his department; and why, in the interests of economy, the training of such men was not utilised.—Mr. TENNANT answered: It would be in accordance with the principle which has been frequently urged in this House that any single man in the Royal Army Medical Corps fit for general service should be transferred to the infantry to make way for the older married men, who would rightly be given a preference as regards less exposed service. Such transfers would not, of course, be made if they involved dislocation of the service from which the transfer was made.

TUESDAY, JULY 4TH.

Proposed Abolition of Certifying Surgeons.

The House considered on second reading the Police, &c. (Miscellaneous Provisions), Bill, one of the clauses of which proposes to abolish the system of reports on accidents in factories and workshops made by certifying surgeons.

Mr. HERBERT SAMUEL (Home Secretary), in moving the second reading, said that he understood that there was considerable opposition to this clause affecting the position of certifying surgeons. It was not proposed to abolish all the functions of these medical men. They would still be called upon in respect of health work in connexion with children, cases of industrial poisoning, and the periodical examination of workers in dangerous trades. The only point with which the clause dealt was the abolition of the reports which the certifying surgeons had hitherto made in reference to the deaths or injuries caused to workers by certain classes of accidents. With regard to about one-third of the whole number of accidents, the law required that the occupier or some other person in charge of the factory should report both to the factory inspector and the certifying surgeon. The latter made a report stating the nature of the accident, and for these reports a sum of £12,500 per annum was paid in fees. The only duty of the certifying surgeon in this regard was to examine the workman and to certify that he had sustained such and such injuries. He had nothing whatever to do with the cause of the accident or how its recurrence could be prevented. What the Home Office really needed in this connexion were not men with medical knowledge, but rather men with mechanical knowledge. These reports made by certifying surgeons were found in practice not to save the factory inspector any work at all, but rather to increase the clerical work and to be a hindrance rather than a help. During the course of the year more than 50,000 of these reports were made by certifying surgeons, and nearly always they were mere duplicates of the report of the occupier of the factory. He would not dream of acquiescing in any change in the law which would weaken the safeguards of the worker. On the contrary, he held they must do everything possible to make industry more safe. But the point was that they did not want doctors but more factory inspectors with technical knowledge. A Special Committee which had sat in 1911 on this subject had unanimously reported that these reports were useless duplications and might with advantage be abolished. He had received no representations against this proposal from the representatives of organised labour, except from some local branches of the Lancashire cotton trade. The Transport Workers' Federation had expressed themselves satisfied with the proposals. The only opposition came from the doctors themselves. They were a highly organised profession, and whenever there was any proposal which touched their interest they were very ready to approach the House of Commons. The present time, when there was a great dearth of doctors in the country, was an opportune time to bring forward this proposal.

Sir H. CRAIK: Does the Bill deal only with the period of the war?

Mr. SAMUEL: No, it does not apply only for the period of the war. It applies permanently. Continuing, the right honourable gentleman said that the Retrenchment Committee had also reported in favour of the abolition of these reports. He did not know how any Member of the House could support their retention. They were not worth the expenditure that they incurred, and he could not continue to ask the Treasury for the £12,500 per annum which they cost in the existing circumstances.

Sir H. CRAIK said he was unwilling to delay a Bill of this kind which was an emergency measure. But he was afraid the arguments of the Home Secretary had not persuaded him that this proposal was justified. He would be the last to oppose any serious proposal for retrenchment, but really they ought to cultivate a sense of proportion. He did not think that the money involved was great enough to induce certifying surgeons to raise an opposition from one end of the country to the other against this proposal. He believed that there were only about 100 surgeons who had anything like considerable pay out of the annual sum of £12,500. About 1900 out of the 2000 surgeons only received mere pittances in fees for the work they did. These were not salaried officers. Certain pay was given for doing certain work. He did not think it was fair to raise a question which had been the subject of dispute for years in an Emergency Bill. In 1901 and 1905 legislation of a similar kind was attempted and had to be abandoned because of the opposition of the working classes. There was not a single representative of the medical profession on the Committee to which the Home Secretary had referred, nor was a single medical witness called before that Committee.

Mr. SAMUEL: Oh, yes.

Sir H. CRAIK said that the certifying surgeons had distinctly informed him that they were not asked to give evidence on the subject. The certifying surgeons considered the professional aspect of the matter as more important than the monetary consideration. They were intimately acquainted with the workers and the accidents to which they were liable, and it was because they wanted to do their best for the workers and had deep sympathy with them in their work that they desired that this part of their work should not be taken away from them. He hoped that the Home Secretary would withdraw the obnoxious clause on the Committee stage.

Mr. TOOTILL said that it was very desirable to effect retrenchment in the Departments of the State, but this should not be done where it was likely to interfere with the protection and safeguards, which ought to be strengthened rather than weakened, in reference to the working classes of the country. In taking up this position he was not animated at all by any kind of interest in the certifying surgeons.

Sir P. MAGNUS said he did not desire to oppose the second reading of the Bill, and he would reserve his additional arguments in favour of the retention of these duties by the certifying surgeons until the Committee stage.

Mr. WALSH said he doubted whether trade unionists all over the country had been aware that this clause was to be forced. For his part, he would see that they were put into possession of the facts before the Committee stage.

Mr. BRACE (Under Secretary to the Home Department) said he was very surprised at the heat which had been developed in the debate and at the suspicion under which the Home Office lay because of this clause in the Bill. They were introducing this proposal because they held that it was an essential and necessary reform in war time or any other time. In 1914 the total number of accidents notified amounted to 159,413, and the number which were also notified by the certifying surgeons was 52,563, or less than one-third of the total accidents. He had examined hundreds of these reports, and in most cases he found them exactly the same as the report which the factory inspector sent in based on information supplied by the employer. If he thought for one moment that the abolition of these reports would introduce danger to the health of life or limb of the factory workers he would not bring forward this proposal. What were needed were more factory inspectors with technical knowledge, and if they were to have a higher standard of medical inspection the Home Office would prefer to have full-time medical inspectors rather than this system of certifying surgeons which at present existed.

Mr. ANEURIN WILLIAMS took objection to the proposal to abolish certifying surgeons. The certifying surgeon had important functions to perform and important information to obtain. He often reported on what should be done to prevent similar accidents recurring in the future. There was certainly a small percentage of cases in which further precautions were required. The certifying surgeon was the man on the spot first after the accident, and he was the man who saw the patient. It was not mechanical accidents with which these medical men had to deal. They had to deal with chemical and electrical accidents. Who was better able to form an opinion about a man who had been gassed? The certifying surgeon constituted, as it were, the sieve through which thousands of accidents passed, and the inspector judged on the reports whether a visit from him was necessary or not. The substantial services rendered in this respect should not be abolished until there was something to put in their place. It was remarkable that no private Member who had spoken had supported the proposal in the Bill.

Mr. BARTLEY DENNISS considered that the economy involved in the abolition of certifying surgeons was very mistaken. This attempt to alter a state of affairs which had prevailed for 70 years was being made at a time when accidents were more frequent than they had been before the war. Inexperience and fatigue were the causes of most of the accidents. There were more dangerous trades at present in operation than before. Yet it was proposed to cut off the certifying surgeon, and at a time when there were not enough factory inspectors.

Mr. WHITEHOUSE protested strongly against the abolition of certifying surgeons.

Mr. GOLDSTONE remarked that these medical men were a guarantee that accurate reports were sent in by the employers.

Mr. H. SAMUEL said that he still thought that large numbers of the reports of certifying surgeons were valueless, and he certainly would not have proposed their abolition if he thought that they were useful. The Home Office was retaining the certifying surgeons' work which dealt with certificates of fitness, dangerous trades, and industrial poisoning. He agreed that there was something to be said for certifying surgeons still being used in special cases. There was a desirability of having reports from medical men where it was a case of septic poisoning or of gassing or a case resulting from some deleterious chemical substance. He had contemplated arranging for medical reports in these cases. He had been impressed by the debate, and he was sure that much had been said under misapprehension. He would give further consideration to suggestions which had been made. He would put down an amendment for the Committee stage which he thought would meet the views of some honourable Members, and which while eliminating wasteful expenditure would endeavour to continue the work of the certifying surgeons where even in a limited number of cases it was likely to be useful to the factory inspector, and also in dangerous cases.

The Bill was then read a second time.

WEDNESDAY, JULY 5TH.

German and Austrian Medical Men.

Mr. GEORGE FABER asked the Home Secretary how many German and Austrian medical practitioners, naturalised and enemy aliens respectively, there were at present in this country; and whether any, and if so how many, of either class were interned.—Mr. HERBERT SAMUEL replied: This information is not available, and could not be obtained without very great labour. The number of German and Austrian medical practitioners left in this country is small, as there was an arrangement for mutual repatriation at the beginning of the war.

Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

HILL, P. E., Colonel, A.M.S.T. (Ret.), has been appointed by the Western Command Medical Officer in charge of the German Prisoners' Working Camp at Crickhowell.

MCMAHON, A. D., M.B., B.Ch. R.U.I., Temporary Tuberculosis Officer for Sunderland.

MURRAY, J. J., M.B., B.Ch. Belf., Dispensary Medical Officer, Downpatrick.

Vacancies.

For further information regarding each vacancy reference should be made to the advertisement (see Index).

When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.

ALTON, HANTS, LORD MAYOR TRELOAR CRIPPLES' HOSPITAL.—Assistant Resident Medical Officer.

BEDFORD COUNTY HOSPITAL.—House Surgeon, unmarried. Salary as arranged, with board, &c.

BETHNAL GREEN INFIRMARY.—Medical Superintendent, &c. Salary, &c., approximately £763 per annum.

BIRMINGHAM AND MIDLAND EYE HOSPITAL, Church-street.—Resident Surgeon. Salary £200 per annum, with board, &c.

BIRMINGHAM UNIVERSITY.—Lecturer in Physiological Department. Salary £200 per annum.

BOLINGBROKE HOSPITAL, Wandsworth Common, S.W.—Resident Medical Officer and House Surgeon. Salary £300 per annum and £200 per annum respectively, with board, &c.

BOLTON INFIRMARY AND DISPENSARY.—Female Third House Surgeon. Salary £180 per annum, with board, &c.

BRISTOL ROYAL INFIRMARY.—House Surgeons and House Physicians. Salary at rate of £120 per annum, with board, &c.
BROMLEY EDUCATION COMMITTEE.—School Medical Officer. Salary £300 per annum.
BURTON-ON-TRENT COUNTY BOROUGH.—Temporary Assistant Medical Officer. Salary £300 per annum.
BURY INFIRMARY.—Junior House Surgeon. Salary £150 per annum, with board, &c.
CAMBRIDGE, ADDENBROOKE'S HOSPITAL.—House Surgeon. Salary £250 per annum, with board, &c.
DEVON AND CORNWALL SANATORIUM, Didworthy, South Brent.—Locum Tenens for four weeks. Salary 6 guineas per week.
GREAT NORTHERN CENTRAL HOSPITAL, Holloway-road, N.—House Surgeon for six months. Salary at rate of £100 per annum, with board, &c.
HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, Brompton.—House Physician for six months. Salary 30 guineas.
HULL, VICTORIA HOSPITAL FOR SICK CHILDREN.—Female House Surgeon. Salary £100 per annum, with board, &c.
KIRKBURTON, STORTHES HALL ASYLUM, near Huddersfield.—Locum Tenens. Salary £7 7s. per week, with board, &c.
LEAMINGTON SPA, WARNEFORD GENERAL HOSPITAL.—Junior Resident Medical Officer. Salary £150 per annum, with board, &c.
LIVERPOOL, BROWNLOW HILL INSTITUTION.—Female Resident Assistant Medical Officer. Salary at rate of £300 per annum, with rations, &c.
LONDON TEMPERANCE HOSPITAL, Hampstead-road, N.W.—Assistant Resident Medical Officer for six months. Salary at rate of £120 per annum, with board, &c. Also Surgical Registrar. Salary at rate of 40 guineas per annum.
LONDON THROAT HOSPITAL, 204, Great Portland-street, W.—House Surgeon. Salary £50 per annum.
MANCHESTER CITY.—Medical Officer. Salary £350 per annum.
MANCHESTER NORTHERN HOSPITAL FOR WOMEN AND CHILDREN, Parkplace, Cheetham Hill-road.—Female House Surgeon. Salary £120 per annum, with board, &c.
MOUNT VERNON HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, 7, Fitzroy-square, W.—Female Clinical Assistants in Outpatient Department.
NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC, Queen-square, Bloomsbury, W.C.—Junior House Physician. Salary £100 per annum, with board, &c.
NORTHAMPTON GENERAL HOSPITAL.—House Surgeon. Salary £150 per annum, with board, &c.
PLYMOUTH, SOUTH DEVON AND EAST CORNWALL HOSPITAL.—House Physician. Salary £200 per annum, with board, &c.
READING, ROYAL BERKSHIRE HOSPITAL.—House Physician for six months. Salary £250 per annum, with board, &c.
ROYAL FREE HOSPITAL, Gray's Inn-road, W.C.—Third Resident Medical Officer in Officers' Section. Salary 14s. per day, &c.
SCOTLAND, NAVAL AUXILIARY HOSPITAL.—X Ray Operator and Anæsthetist.
WEST RIDING OF YORKSHIRE, MIDDLETON-IN-WHARFEDALE SANATORIUM, near Ilkley.—Assistant Medical Officer. Salary £350 per annum.

THE Chief Inspector of Factories, Home Office, London, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Dufftown, Banff; at Longton, Lancs; at Tibshelf, Derby; at Girvan, Ayr; at Rothwell, Northampton; at King's Lynn, Norfolk; and at Swansea, Glamorgan.

Births, Marriages, and Deaths.

BIRTHS.

BIRKS.—On June 26th, at Harpur-place, Bedford, the wife of Guy Thornton Birks, M.B. Cantab., of a son.
CHETWOOD.—On June 27th, at Montgomery-road, Sharrow, Sheffield, to Dr. and Mrs. Thomas Chetwood, a daughter.
HOLMES.—On June 19th, at University-road, Belfast, the wife of T. S. Holmes, M.Ch., F.R.C.S. Eng., of a son.
HUTCHINSON.—On June 28th, at Poona, India, the wife of Major F. H. G. Hutchinson, I.M.S., of a son.
LEA-WILSON.—On June 20th, at Beauchamp-avenue, Leamington Spa, the wife of Captain B. Lea-Wilson, R.A.M.C., of a son.
MAYOU.—On June 24th, at Ridinghouse street, W., the wife of M. S. Mayou, F.R.C.S., of a daughter.
REIDY.—On July 1st, at 314, Commercial-road, Stepney, E., the wife of Jerome J. Reidy, M.D., of a daughter.
SYMONDS.—On June 25th, at Wykeham House, Oxford, to Captain C. P. Symonds, R.A.M.C., and Mrs. Symonds—a son.
WILLIAMS.—On June 30th, at Devonshire-street, W., the wife of Gwynne Williams, Captain, R.A.M.C. (T.), of a son.

MARRIAGES.

GOFFE—POWELL.—On Saturday, July 1st, at King's Weigh House Church, London, W., by the father of the bride, Ernest George Goffe, M.D., B.S. Lond., Senior Assistant Medical Officer, North-Eastern Hospital, Tottenham, son of the late John Beecham Goffe, Esq., J.P., of Port Maria, Jamaica, to Edna Mary Powell, M.B., B.S. Lond., eldest daughter of the Rev. Edward Pearce Powell, M.A., of Sutton, Surrey.

DEATHS.

BUXTON.—On June 26th, at Fazeley, Tamworth, Thomas Buxton, L.R.C.P., L.M., M.R.C.S., in his 60th year.
DUNLOP.—On July 3rd, of pneumonia, at a Red Cross Hospital, Major G. H. Melville Dunlop, M.D., R.A.M.C., aged 57 years.
ROBERTS.—On June 15th, at The Acacias, Hayling Island, Frank Ernest Roberts, M.R.C.S. Eng., late of Tulse Dale, West Norwood, in his 65th year.
RUBEL.—On June 21st, at Dover, John Leopold Rubel, M.R.C.S., L.R.C.P., aged 60 years.
TATE.—On July 5th, at 1, Queen Anne-street, Cavendish-square, W., Walter W. H. Tate, M.D., F.R.C.P. Funeral service at St. Andrew's, Well-street, on Saturday, 8th inst., at 2.15.

N.B.—A fee of 5s. is charged for the Insertion of Notices of Births, Marriages, and Deaths.

Notes, Short Comments, and Answers to Correspondents.

THE PRIVATE REMOVAL OF SICK OR WOUNDED FROM ABROAD.

To the Editor of THE LANCET.

SIR,—A sick or wounded man lying in a military hospital abroad may have friends who would be glad to fetch him home themselves, or they might like to depute the mission to a medical man, rather than await the invalid's arrival by a hospital convoy.

Is it permissible for a civilian to visit a patient at a military hospital abroad, and possible to obtain the consent of the authorities to the man's removal as an ordinary traveller?

I am, Sir, yours faithfully,
July 3rd, 1916. M.D.

*** Every case would entail a separate application for permission, and freedom of travel is necessarily largely abolished for civilians.—ED. L.

A DISTINCTIVE MEDICINE BOTTLE.

IF only for the reason that it emphasises a need, we welcome any invention that has for its object the prevention of deaths by accidental poisoning where the victim has taken the poison in mistake for medicine. Mr. W. F. Hills, of 12, Marine-terrace, Margate, has submitted to us a device consisting of a sheath, made to fit any shaped bottle, on which is a clock dial with movable hands. An annular opening at the base of one of the hands indicates the interval, in hours, at which the medicine is to be given, while the hands can be set for the time at which the next dose is to be taken. The inventor contends that if medicines were always kept in such a sheath-covered bottle it would amount to criminal negligence if accident ensued when they were given from any other kind of bottle. Owing to the surface of the sheath, he adds, and its general physical properties being in sharp contrast to those of a glass bottle, the medicine bottle would be recognisable instantly by touch and could be found in the dark. That the device costs little to manufacture is a real argument in its favour, otherwise it possesses no advantages over other contrivances with a similar object. The specimen sheath sent to us is made of celluloid, and ordinary celluloid paraphernalia should not be multiplied in the sick-room.

NECESSITOUS LADIES HOLIDAY FUND.

To the Editor of THE LANCET.

SIR,—Much self-sacrificing help has been given to other charities to meet the needs this awful war has involved, whilst the poor ladies are likely to be overlooked, and yet no class has suffered so pitiably as the poorer gentry through loss of work and therefore of money.

Any contributions sent to me at this address will be thankfully acknowledged and distributed.

I am, Sir, your obedient servant,
CONSTANCE BEERBOHM.
48, Upper Berkeley-street, London, W., June 30th, 1916.

THE DESTRUCTION OF COCKROACHES.

To the Editor of THE LANCET.

SIR,—With reference to recent correspondence in your columns on this subject, may I call the attention of your readers to a book "Some New and Interesting Points in Ship's Hygiene," by Dr. W. Melville-Davison, medical superintendent of the Booth Steamship Company, Limited, recently published by John Wright and Sons, Limited. It deals with various pests, amongst which are cockroaches, giving their life-history and method of destruction. It is a work well worth reading, and is one to which, in my official capacity, I am always referring.

I am, Sir, yours faithfully,
July 4th, 1916. D.P.H.

METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, July 5th, 1916.

Date.	Barometer reduced to Sea Level and 32° F.	Direction of Wind.	Rainfall.	Solar Radio in Vacuo.	Maximum Temp. Shade.	Min. Temp.	Wet Bulb.	Dry Bulb.	Remarks.
June 29	29·860	W.	0·29	127	67	52	54	59	Cloudy
,, 30	29·764	S.W.	...	121	70	54	56	59	Cloudy
July 1	29·970	S.W.	...	122	68	52	54	60	Cloudy
,, 2	29·900	S.W.	0·02	124	70	51	55	60	Cloudy
,, 3	29·776	S.W.	0·02	97	67	50	56	58	Cloudy
,, 4	29·740	S.	...	107	70	52	56	59	Cloudy
,, 5	29·854	N.W.	...	122	73	57	57	59	Overcast

Medical Diary for the ensuing Week.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

POST-GRADUATE COLLEGE, West London Hospital, Hammersmith, road, W.

MONDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.

TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Women. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations. Dr. Simson: Diseases of Women.

THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.

FRIDAY.—10 A.M., Dr. Simson: Gynæcological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

SATURDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY.—Clinics:—10.30 A.M., Surgical Out-patients (Mr. E. Gillespie). 2.30 P.M., Medical Out-patients (Dr. T. R. Whipham); Gynæcological Out-patients (Dr. Banister). 3 P.M., Medical In-patients (Dr. R. M. Leslie).

TUESDAY.—2.30 P.M., Surgical Operations (Mr. Carson). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. Howell Evans); Nose, Throat, and Ear Out-patients (Mr. C. H. Hayton). Radiography (Dr. Metcalfe). 3.30 P.M., Medical In-patients (Dr. A. J. Whiting).

WEDNESDAY.—Clinics:—2.30 P.M., Throat Operations (Mr. C. H. Hayton). Children Out-patients (Dr. T. R. Whipham); Eye Out-patients (Mr. R. P. Brooks); Skin Out-patients (Dr. H. W. Barber). 5.30 P.M., Eye Operations (Mr. R. P. Brooks).

THURSDAY.—2.30 P.M., Gynæcological Operations (Dr. A. E. Giles). Clinics:—Medical Out-patients (Dr. A. J. Whiting); Surgical Out-patients (Mr. Carson); Radiography (Dr. Metcalfe). 3 P.M., Medical In-patients (Dr. R. M. Leslie).

FRIDAY.—2.30 P.M., Surgical Operations (Mr. Howell Evans). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. E. Gillespie); Eye Out-patients (Mr. R. P. Brooks).

THE THROAT HOSPITAL, Golden-square, W.

MONDAY.—5.15 P.M., Special Demonstration of Selected Cases.
THURSDAY.—5.15 P.M., Clinical Lecture.

BOOKS, ETC., RECEIVED.

ALLEN, GEORGE, AND UNWIN, London.
War Time Silhouettes. By Stephen Hudson. Price 3*s.* 6*d.* net.
Deeper Causes of the War. By Emile Hovelaque. With preface by Sir Walter Raleigh. Price 2*s.* 6*d.* net.

BAILLIÈRE, TINDALL, AND COX, London.
Aids to Obstetrics. By S. Nall, B.A., M.B. Cantab., M.R.C.P. Revised by C. J. N. Longridge, M.D. Vict., F.R.C.S. Eng., M.R.C.P. Lond. Eighth edition. Price 2*s.* 6d. net.
Aids to Bacteriology. By C. G. Moor, M.A. Cantab., F.I.C., and W. Partridge, F.I.C. Third edition. Price 3*s.* 6*d.* net.

BENGAL SECRETARIAT BOOK DEPÔT, Calcutta.
Catalogue of the Pathological Museum Medical College, Calcutta. By J. F. P. McConnell, M.B., M.C., M.R.C.S. Eng. Revised by Leonard Rogers, M.D., F.R.C.P., B.S., F.R.C.S., I.M.S. Vol. I., £1 1*s.*; Vol. II., 18*s.* 9*d.*

BLAKISTON'S (P.) SONS AND CO., Philadelphia.
A Manual of Gynæcology and Pelvic Surgery for Students and Practitioners. By Roland H. Skeel, A.M., M.S., M.D. Price $3 net.

CHAPMAN AND HALL, London.
The War and the Soul. By Rev. R. J. Campbell. Price 6*s.* net.
The Declining Birth-rate: Its Causes and Effects. Price 10*s.* 6*d.* net.

GENERATION PRESS CO., 1, Adelaide-street, W.C.
Fool Culture: On Education, Misgovernment, and Destiny. By Kirton Varley. Price 2*s.* 6*d.* net.

HEINEMANN, WILLIAM, London.
Diseases of Women: A Handbook for Students and Practitioners. By Sir John Bland-Sutton, F.R.C.S. Eng., LL.D.; and Arthur Giles, M.D., B.Sc. Lond., F.R.C.S. Seventh edition. Price 15*s.* net.

LIPPINCOTT COMPANY, London and Philadelphia.
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